DOCUMENT RESUME

ED 166 947 FL 009 994

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TITLE Bilingual and Bicultural Adaptation. Educational and Psychological Interactions. Bulletin No. 66.
INSTITUTION School of Education, Malmo (Sweden). Dept. of Educational and Psychological Research.
PUB DATE Mar 78
NOTE 76p.

EDRS PRICE MF-$0.83 HC-$4.67 Plus Postage.
DESCRIPTORS *Adjustment (to Environment); Age; Biculturalism; *Bilingualism; Bilingual Students; Child Development; Cognitive Development; Emotional Adjustment; Emotional Development; English (Second Language); Fles; Immigrants; Language Development; Language Instruction; Language Proficiency; Language Skills; *Language Tests; Psychoeducational Processes; *Psycholinguistics; Psychological Needs; Psychological Studies; Psychophysiology; *Second Language Learning; *Sociocconomic Influences

ABSTRACT

This report is a compilation of five research papers in second language acquisition and immigrant adaptability that are part of studies conducted in Sweden over the last twenty years. (1) "Language teaching and psycho-physics" discusses basic measurement problems in the assessment of second language proficiency, where testing of writing and reading skills has overshadowed listening comprehension and pronunciation skills in importance. (2) "Measuring foreign language achievement in the ages 7-10 years" deals with the optimum age problem in second language learning when the setting is modern language learning in a school situation, and tests the possibility of the formation of learning sets. (3) "Age and length of residence as variables related to the adjustment of migrant children" complements the above discussion on optimum age problems, with the setting as language learning in a foreign cultural environment. (4) "Adjustment among immigrant peoples in Sweden" studies the relation between language learning and socio-emotional adjustment. (5) "Social and individual frame factors in second language acquisition: Comparative aspects" considers a number of variables in the two language learning situations described above. It is concluded that different levels of measurement of language functions such as the physical, psychological, neuro-physiological, neurological, educational, and linguistic levels, should be regarded as complementary, not exchangeable. (Author/MBP)

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ED166947

bulletin from

DEPARTMENT OF
EDUCATIONAL AND
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SCHOOL OF EDUCATION
MALMÖ, SWEDEN

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educational and psychological interactions

Ekstrand, L. H.:

BILINGUAL AND BICULTURAL ADAPTATION

No. 66 March 1978

FL009994

BILINGUAL AND BICULTURAL ADAPTATION

Studies in the assessment of second language learning
and of factors related to bicultural adjustment,
with special reference to immigrant children

Lars Henric Ekstrand

Ekstrand, L.H. Bilingual and bicultural adaptation. Educational and Psychological Interactions (Malmö, Sweden: School of Education), No. 66, 1978.

The report summarizes five previous papers by the present author, and attempts to put them into a theoretical frame of reference. The first paper deals with basic metric problems in the assessment of second-language proficiency. The second paper deals with the optimum age problem in second-language learning when the setting is modern language learning in a school situation. The third paper deals with the optimum age problem when the setting is language learning in a foreign cultural environment. The fourth paper deals with the relation between language learning and socio-emotional adjustment. The fifth paper considers a number of social and individual frame factors in the two language learning settings described above. - This report is a slightly revised version of the summary part of the author's doctoral dissertation, presented at the Institute of International Education, Stockholm.

Keywords: Acculturation, adjustment, age differences, bilingualism, child development, cross-cultural research, cognitive development, emotional development, emigration, FLES, immigration, learning set, migration, minority groups, second languages.

INTRODUCTION: THE PROBLEM AND ITS SETTING

A historical perspective

Modern technology has created a large number of means for communication and travel. As the Royal Commission (1967, vol. I:li) points out, these new means of communication are more and more making the world a unit. Other trends, too, contribute to this. National jurisdictions and barriers are being superseded with international organizations such as the U.N. and its specialized agencies, the OECD and the Common Market.

Both nations and individuals are adapting to this rapid internationalization in a number of ways. Individuals learn foreign languages and above all, they migrate for a variety of reasons, demographis, social, psychological, political, cultural and economical (Stark, 1967).

Besides adapting her policies to this new situation, a nation can facilitate the individual adaptation in various ways. Two of the most important ways are the organization of foreign language teaching for her own citizens, and the organization of teaching her own language, as well as other action to facilitate adjustment, when immigrants come to her.

There have been two big waves of international interest in measures for bilingual and bicultural adjustment. The first wave consisted of the FLES movement (FLES = Foreign Languages in the Elementary School), which started immediately after World War II (Donoghue, 1965, 1969) and in fact is still going on all over the world, in spite of occasional claims of the opposite (Kunkle, 1972). The FLES movement is often said to have started in the U.S.A., but as will be shown below, there are instances of countries in which the making of an early, large-scale foreign language teaching started well before the World War II. In any case, the movement spread throughout the world.

A number of factors contributed to the interest in the United States as well as in other countries for FLES. World War II experiences had shown that isolationalism was an impossible way to go. Politicians showed a new interest in overseas contacts. (The Sputnik shock triggered an increased interest in foreign language teaching - but at the high school level; Conant, 1959.) Technical advances, such as the tape-recorder and other audio-visual aids made it possible to bring authentic voices and sceneries into the class-room at comparatively small a cost. Experiences from language teaching in the U.S. Army showed that fast foreign language learning indeed was possible with the aid of audio-visuals and total im-

mersion approaches. Salient features of the later methods were later incorporated in what should become known as the direct method, though admittedly this method also has roots further back in time (Ekstrand, 1964). However, the new technology made provisions for a broader application of such approaches.

It is no wonder that small countries were among the first ones to make largescale experiments with FLES and also to make it a regular component of the curriculum. The introduction of FLES in most cases meant an earlier start for foreign language teaching than there had been before.

Sweden may be taken as an example of this trend. In fact, it can be shown that it had started in Sweden before the World War II. As shown in Table 1, voluntary English teaching occurred in the elementary school as early as in 1933. In grammar schools, foreign language teaching was compulsory from the early grades on. In Sweden, as in many other European countries, grammar school and the elementary school run parallel during a few grades. Experimental English in the elementary schools increased, at an accelerating rate, from 1933 to 1947.

Table 1. The development of English teaching in Swedish primary schools 1933 - 1948. Source: Ekstrand, 1964.

Academic year	Number of headmaster units
1932/33	27
1942/43	62
1943/44	75
1946/47	135
1947/48	235

1946 was in many respects a turning point for FLES in Sweden. This year the National Board of Education* was authorized by the Ministry of Education to grant permission for the teaching of English in grades 7 and 8 to those headmaster units that applied for such teaching. Often such permissions were granted for grade 6 and sometimes even grade 5. In the same year Radio Sweden started so-called radio teaching for grade 6 and the following year also for grade 5 (Ekstrand, 1964).

In 1947 the Ministry of Education established criteria for teachers' competence for the teaching of English and the Board of Education started arranging inservice teacher training courses in English. In the academic year 1949/50 the experimental comprehensive school was launched in a few Local Government Authorities (L.G.A.s). In the experimental schools,

*Sweden has a system of central executive agencies or boards, under the supervision of the respective ministries. The ministries limit their role to political decision-making, the initiating of investigations and inquiries, and other policy-making action.

English was begun in grade 5 (Ekstrand, 1964). In 1962, when the comprehensive school by parliament decision was introduced all over Sweden, English was moved to grade 4 (= Lgr 62). In 1969, when a revised comprehensive school curriculum was introduced by parliament decision, English was moved to grade 3 (= Lgr 69). In the 1962 as well as in 1969 curriculae, German or French could be chosen as an option in grades 7-9. In the 1962 curriculum, English was compulsory through grade 7 and optional in grades 8-9. In the 1969 curriculum, English became a compulsory subject also in grades 8 and 9.

Now and again voices have been raised in favor of starting English even earlier, but also in favor of the opposite. Arguments for the moving of the so-called B-languages (French and German) to grade 6 from grade 7 have been advanced, but so far not seriously discussed.

In 1957, experiments with early English teaching in grades 1-4 were begun in the cities of Stockholm, Linköping and Västerås and some surrounding L.G.A.s. In many such L.G.A.s the teaching of English in grades 1-3 was continued, after the experiment proper was closed, until 1969 when English became a compulsory subject from grade 3 in all Swedish schools. (Personal communication from certain headmasters.) The experiment was supervised by the National Board of Education.

In 1958, the National Board of Education conducted a large-scale study of English in grade 6, administering questionnaires to about 600 teachers and tests to more than 5,300 pupils, distributed over 262 classes all over Sweden. The sample was biased in the sense that only experimental comprehensive schools were represented. The bias means among other things that rural areas, which as a rule were slow to switch over to the comprehensive school, were underrepresented. On the whole, however, the bias introduced did not seriously affect results related to the problems that were studied in this research. The results were reported by Ekstrand (1962, a, b, 1964).

In 1963, the National Board of Education conducted a follow-up study in grade 5 of the results of the early English teaching in grades 1-4. The results have been preliminarily reported by Ekstrand (1964) who found no large differences between experimental pupils and control pupils. Experimental pupils had varying experience of early English teaching. Some interesting regression trends in the grade 5 results for the experimental pupils suggest that the time factor is of importance, as has been suggested by Carroll (1975), but the analyses have not been pursued further (Ekstrand, unpublished data).

By the 1962 Reform Bill, the Experimental and Research Department of the Board of Education was closed down. This department had been set up for the purposes of the preparation of the new comprehensive school, which started in 1962. After a reorganization of the Board of Education in 1964, a new policy was introduced to the effect that school research should be carried out by the university institutions and the schools of education, not be the Board of Education itself (PM, 1964).

After 1965, a number of large-scale studies in second language (L2) acquisition have been conducted in Sweden. Among such projects may be mentioned "UME" (UndervisningsMetodik i Engelska/Teaching Techniques in English/), which was a multi-media systems approach to the teaching of English in grade 7; "UMT" (UndervisningsMetodik i Tyska/Teaching Techniques in German/), which was a method-materials system development project for grades 7-9; "GUME", which involved a comparison between 'explicit' and 'implicit' teaching methods in English; "EPÅL" (Engelska PÅ Lågstadiet/English in Primary School/), which is still running and is a long-time follow-up study of the effects of early English teaching; and the IEA studies of French and English, which are world-wide comparisons between the effects of the teaching of foreign languages in a large number of countries. In addition, a number of studies of foreign language teaching at the university level have been conducted (Skolöverstyrelsen, 1976).

The second wave of interest in L2 was caused by the onset of migration during the fifties and above all the sixties. Now the interest in many countries was turned to the teaching of the national language as a foreign language. Strangely, the two main types of second language teaching, modern languages to the native residents and the own language to immigrants, have not attracted a mutual interest on the part of those who work in these related fields. Rather, at least in Sweden, teaching and research, with a few exceptions, run as it were in two different furrows, though the questions asked are much the same. To the educational psychologist, it should be an interesting task to compare methods and results in the two different situations.

Until about 1930, Sweden was an emigrant country. After 1930, immigration has been larger than emigration, but for some years both curves were rather insignificant (Olofsson, 1973). After World War II, immigration caught on, at an increasing rate.

Industry needed labour and the workers frequently brought their families.

Children in school ages started coming to the schools, at any time of the academic year. The government soon provided funds to pay for four lessons in Swedish weekly, which in 1958 was changed to six lessons weekly. As the size of groups was left open, L.G.A.s, especially those with many immigrant children, in practice had a rather powerful resource in these lessons. They were soon being used to give the newly arrived pupils intensive language teaching during several lessons per week in so-called preparatory classes.

To-day, the majority of pupils of foreign extraction in need of special measures are born in Sweden. The statistics are somewhat uncertain, in part due to a too broad definition of immigrant pupils, in part due to ignorance on part of the schools in providing the data. We may with some degree of certainty assume that 8-10 % of the pupils in the Swedish comprehensive school are of foreign extraction. As the total number of pupils in each grade of the comprehensive school is around 100,000 (take or give 10 % due to variations in birth rate) we may estimate that minority children total around 90,000 in grades 1-9.

The official figures were 63,000 in 1975 and 78,000 in 1976 (SM U 1975, 1976). These figures probably are underestimations. Out of this number, around 41 % are estimated to need tuition in Swedish and sometimes in the home language. Included in this number are the pupils who actually immigrate. The figures for yearly immigration of pupils in school ages are given in Table 2. The figures are gross numbers, i.e. emigration is not deducted. They are taken from the official statistics of population changes in Sweden. Unfortunately, age is not accounted for in one-year classes after 1973 in the official statistics.

Table 2. Yearly immigration to Sweden of children in school age. Statistical Yearbook 1946 - 1973.

Year	Number	Year	Number	Year	Number
1946	3,178	1956	2,324	1966	4,249
1947	4,630	1957	3,160	1967	3,061
1948	5,603	1958	1,978	1968	3,654
1949	2,301	1959	1,804	1969	7,301
1950	1,299	1960	2,580	1970	8,615
1951	2,590	1961	2,940	1971	4,617
1952	1,164	1962	2,453	1972	3,109
1953	1,409	1963	2,570	1973	3,195
1954	1,121	1964	3,772	1974	
1955	2,372	1965	4,423	1975	

In 1966, immigration to Sweden became regulated. The labour market movements between the Nordic countries remained free, however. A number of studies have been conducted in Sweden concerning the bilingual and bicultural adjustment of immigrants, children as well as adults. One of the earliest was a large-scale study of immigrant pupils in the comprehensive school, conducted by me in 1965/66 (Ekstrand, 1976 a, b, 1977 a).

Types of bilingualism

From the preceeding presentation it is obvious that bilingual persons may learn and use their languages in quite different circumstances. I believe that the types of circumstances may be more basic to our understanding of how bilingualism is acquired and how bilingual teaching should be organized than all the various attempts to define bilingualism as a property of the individual.

In order to define bilingualism as a state in the individual one must first define what a language is and then decide how much of each language the individual must know in order to be classified as a bilingual or to what degree he is a bilingual. While the question of degree of bilingualism has great practical consequences, for instance in research work, the problem has tended to exert almost a bewitchment on the part of those who have discussed it. Some researchers believe that different kinds of bilingualism actually correspond to different types of biological events in the individual (Ervin & Osgood, 1965). A host of writers after that have tried to differentiate between "natural" and "artificial" bilingualism.

To me, the only definition possible is operational. As soon as an individual learns a foreign word, actively or passively, he is bilingual to some degree. The word foreign is introduced here with some hesitation and only for clarifying the discussion. It seems to me that the person who can master different idioms within his own language is as much bilingual as the one who can master two different languages. For many individuals, it may actually be easier to learn to master two or more languages on his intellectual and social level than to master different language styles within his own language.

I also contend that it is the individual's level of development, for instance defined as period according to the Piaget classification, that is decisive for variations in language acquisition ability, in interaction with the environment. In any situation, the basic learning mechanisms of the limbic system are the same, regardless of language. I contend that

many writers confuse intrinsic properties of language acquisition with extrinsic ones.

Three main types of situation in which more than one language is being learned may be distinguished. (1) Stationary bilingualism. Two or more languages are being spoken by the resident population or populations. (2) Immigration, which in the case of children may be subdivided into two situations: (a) those who actually immigrate must adjust to a new environment, a new language and a new culture; (b) those who are born in the new country become familiar with the setting from the beginning. Regarding language and culture, they may or may not become bilingual and bicultural from the beginning, but must soon learn the language of the country and adjust to its culture. (3) The learning of foreign languages by the native citizens of a country.

These types often combine into complex patterns. Also, one type, such as immigration, may in some cases be transient and pass into another type, for instance type 1. The interesting fact which emerges from this kind of classification is that the different types of situations pose quite different demands on the individuals as well as on society.

Take for instance the case of Slovenia. Here, children, from pre-school onwards, nowadays are educated bilingually and biculturally. Pupils who speak Slovenian or Hungarian go together in the same classes and follow the same curriculum. All teachers must be bilingual. The pupil uses the language he knows best. The aim is that the child shall acquire command of both languages. In administration and all official contexts, either language may be used. This is true for all Slovenia.

The two languages belong to different families. In both cases, the spelling is phonetic. Learning to read starts with L 1, but already in grade 2, reading and writing in L 2 is being learned. In the various subjects, the contents are learned first in one language, then in the other. A high degree of individualization is necessary to prevent children from being left behind. Class size has been cut from a maximum of 36 to 24 pupils.

Immigrant pupils are taught in a somewhat less integrated way. The minimum number of pupils required to open a bilingual school with e.g. Serbo-Croatian or Italian as one of the languages is 20 children in grades 1-4. Many minority groups come to Slovenia, and if it is not possible to arrange teaching in the home language, the child must learn Slovenian. (Lūk, 1977; Kerčmar, 1977; Sobota, 1977; Virtič, 1977; personal communications.)

Foreign language learning starts in grade 5, where there is a choice between English and German in Ljublana, and in other parts of Slovenia also between French and Russian.

Looking closer at the three basic second language learning situations, it is obvious that they pose different demands on individuals and society, in a lowering scale from type 1 to type 3. In many stationary bilingual areas, there is a rather high degree of ambition for a balanced bilingualism, in for instance Canada or Friesland. In fact, in Slovenia they seem to have one of the most advanced solutions in the world. Nevertheless, ambition is lowered for each situation. Foreign language teaching does not start until grade 5, which, however, is not late as compared to many Western countries, but late in comparison to the advanced solution for the stationary situation. Also, foreign language teaching is conducted in a conventional way regarding teaching methods, number of weekly lessons, etc.

Important factors seem to be two related ones, the degree of use for the second language and the opportunity to practise it. In addition, the amount of work that an individual can undertake in order to keep a certain standard is decisive for a realistic level of ambition.

Studies are being conducted to explore the process of decay of a language once learned (Stankowski, 1977, personal communication). The work is done on the phonological, the lexical and the grammatical levels. The elements which are first forgotten are those most distant from the new language which is replacing the old one. The elements which show the greatest similarity remain longest, but are changed in the direction of the other language. In fact, there seems to be a mutual attraction towards an "intersection" of both languages. As long as there is some kind of structure left, forgotten elements may be easily restored. When the very framework of the structure starts withering, the process of decay progresses very rapidly and it takes a certain amount of work to restore the language skills again (Stankowski, 1977, personal communication). His results seem to be in harmony with those of Oksaar (1976).

It would be bad economics for society and pose hard demands on the individual to aim at a balanced bilingualism, for instance for Swedish pupils learning English. Similarly, it would not be worth the effort to maintain such a high level of ambition for immigrant children's home language. For Finnish children in Sweden, a level intermediate to that of stationary bilingualism and foreign language learning might be appropriate.

The problem is one of optimization within a given frame of resources. For some immigrant children, the optimum might well be to keep the level a bit above the risk level for complete decay.

In order to find the solutions to practical bilingualism, the salient individual and social frame factors should be considered. Where there is invariance over types of bilingual situation, we must likely deal with basic individual, biologically anchored, language learning variables. Where there is a systematic variation with type of situation, we have to do with the interaction bet. .en basic and situational variables. In order to optimize language learning it must be organized according to such knowledge. Furthermore, in actual school practice, the teaching should be built on every individual pupil´s situation and needs, as well as on his cognitive capacity.

The confusion in research on bilingualism today is due to contradictory theories. In part, this confusion is due to results from different types of bilingualism, obtained by different research methods. In part, the confusion arises from faulty interpretations of the direction of causality in obtained relationships. For instance, experiments relating cognitive factors to bilingualism have frequently been conducted. Typically, bilinguals are compared with unilinguals. If differences in cognitive functioning are obtained, the results are ascribed to the variable bilingualism/unilingualism.

In survey studies, intelligence differences between monolingual and bilingual groups used to be obtained in the early studies, but they disappeared when nonverbal measures were used and, above all, when SES was controlled (Ekstrand, 1977). Today, in experimental studies, the direction of causality often seems to be taken for granted. If monolinguals and bilinguals are compared and there are differences in cognitive factors, the differences are ascribed to the variable bilingualism/monolingualism. As long as subjects are not randomly assigned to bilingualism/unilingualism, which seldom is the case, it cannot be excluded that a selection with regard to cognitive level has taken place. In other words, subjects with a cognitive ability suitable for language learning may have become bilinguals. The problem of the direction of causality, as well as other factors related to L 2 learning, will be discussed in more detail elsewhere in this paper.

We will make the basic assumption that L 1 and L 2 learning is processed via the same brain mechanisms. In other words, there is only one set

of mechanisms for various types of language learning. Consequently, variations in learning may be ascribed to four types of factors: (a) variations in the total learning situation as described above, (b) the level of general cognitive, perceptual and psycho-motor development as discussed above, (c) effects of previous learning, such as transfer effects, learning set formation and other changes which are due to the operation of the set of brain mechanisms assumed, and (d) nature of the language being learned.

The evidence which makes such an assumption possible is as follows. In the first place, students of the biology of language, such as Penfield and Roberts (1959) or Lenneberg (1967) have not discovered different mechanisms for different languages or situations. Instead, their discussion of foreign language learning is based on the more or less explicit assumption that the same mechanisms are operating in all language learning. Secondly, empirical evidence for a strong similarity in L 1 and L 2 learning is piling up (Garvie, 1973; Asher, 1972; Dulay & Burt, 1972, 1973, 1974, a, b; Snow,1976b; Hansen-Bede, 1975; Macnamara, 1975; Rado, 1975).

Furthermore, the discussions of empirical evidence for differences in L 1 and L 2 learning tend to focus on the four types of factors stated above (Dulay & Burt, 1974 c; Hatch, 1974; Chun, 1976). Also, results from Bailey et al. (1974) and Krashen et al. (1976) suggest that adult learners, despite differences in amount of instruction, mother tongue and exposure to English, use a basic learning structure, similar to that of children.

Problems of cultural adjustment and language learning

It might be useful to list a number of problems which are in the focus of the interest of researchers all over the world, even though such a list must become somewhat arbitrary. The list is presented in Table 3.

A number of these questions have been directly studied in the papers on which this report is based. Virtually all questions are touched upon in the theoretical parts of the papers or in the present attempt to a synthesis of my own papers and a number of other research findings.

The contents of the present report

The following sections present summaries and discussions of five selected papers focusing on problems related to the second and third types of bilingual situation. The papers present empirical findings and discuss aspects of most of the problems listed in Table 3.

Table 3. List of research problems in bilingual and bicultural adaptation.

A. Problems of cultural adjustment: social, emotional and academic adjustment

1. Is there a higher rate of emotional disturbances in immigrant children than in native children?
2. Is "culture shock" a meaningful diagnostic concept?
3. Are there disturbances, specifically created by the process of migration?
4. If there are, by which mechanisms are the disturbances created?
5. What influences, if any, may migration exert on the cognitive development?
6. How is a normal emotional development related to age?
7. How is social and emotional adjustment related to length of residence?
8. How is social and emotional adjustment related to language learning?
9. Which role does motivation play in L 2 learning?

B. Problems of second language learning and bilingualism

1. Is there a critical period for language learning?
2. Is there an optimal age for L 2 learning?
3. Are there sex differences in L 2 learning?
4. What role do various native language factors play in L 2 learning?
5. What role do other cognitive factors play in L 2 learning?
6. Which brain mechanisms are involved in L 2 learning?
7. What role does aptitude play in L 2 learning?
8. What role do personality factors play in L 2 learning?
9. What role do school and teaching factors play in L 2 learning?
10. What role do cultural factors play in L 2 learning?
11. What role does the learning of one or more foreign languages play in the learning of following languages?
12. How does L 2 learning and bilingualism affect cognitive functions?
13. How do socio-economic variables affect L 2 learning?
14. How should various aspects of L 2 proficiency be assessed?
15. Hos does L 2 acquisition affect academic achievement in other subjects?
16. Hos does L 2 acquisition affect the acquisition of the native language?
17. Is there scientific ground for the term semilingualism?
18. Are there basically different kinds of bilingualism?

(1) The first paper, "Språkpedagogik och psykofysik" (1962) /Language teaching and psycho-physics/, deals with problems of measurement. Most studies before 1960 typically used 'silent' measures, i.e. listening comprehension was seldom assessed and pronunciation as a rule was measured with paper-and-pencil tests, if at all. As the experiments with early English teaching in Sweden, mentioned in the Introduction, aimed at preparatory training in exactly these two variables, the need for reliable tests was great. As the pupils to be tested were in some cases so young that they had not yet achieved good command of reading and writing in their native language, let alone a foreign language, the tests could not rely on these skills. The same requirements must be met in tests for immigrant pupils. Also from

other points of view, it is desirable to measure language variables as purely as possible in order to avoid confounding pronunciation ability with reading or writing ability which might easily be the case with paper-and-pencil tests. Some of the techniques developed were used in the other studies to be reported here.

(2) The second paper, "Mätning av språkfärdighet i åldrarna 7-10 år" (1964) /Measuring foreign language achievement in the ages 7-10 years/, deals primarily with age comparisons, but also with effects of native dialect and of urban-rural environments and with the interrelationships between pronunciation, listening comprehension and general intelligence. The experiment reported primarily tests the Penfield-Roberts theory of an optimum for second language learning around the age of 8-9 years. A second aim was to test the possibility of the formation of learning sets.

(3) The third paper. "Age and length of residence as variables related to the adjustment of migrant children" (1976 b), also deals primarily with the optimal age problem. The age span at the time for testing was 8-17:4 years, i.e. it goes beyond the critical period of Lenneberg (1967) for native as well as second language acquisition. The critical period ranges from onset of speech to onset of puberty, i.e. a ten year period from around the age of 3 to the age of about 13. This study is complementary to the previous one in several ways. It covers a wider age range and it comprises and tests more variables. It deals with immigrant children and is thus testing a different bilingual situation, since it includes various cultures and native languages. In both studies test data are plotted against age data, finely enough graded to reveal a possible optimum. Together, the two studies represent rather massive evidence against all the early optimum theories but in favor of a progressive developmental course of foreign language learning ability.

(4) The fourth paper, "Adjustment among immigrant pupils in Sweden" (1976 a), is an account for a correlational study of another widely discussed problem, viz. that of the relationship between language acquisition and social and emotional adjustment in immigrant children. The study uses the same data set as the previous one. A wide range of measurements and background data was secured for a population of immigrants in the comprehensive school in Sweden. This data set has been used as a data bank, since a number of problems have been studied or are under study, utilizing data from this bank. Apart from studying the relationship mentioned, the correlation matrices also provide information on the relationships between

language variables, between language variables and other cognitive variables, on the whole the relationships within and between the four domains of measurement, viz. adjustment measures, language tests, reading tests and intelligence tests.

(5) The fifth paper, "Social and individual frame factors in second language acquisition: Comparative aspects" (1977 b), discusses a number of individual variables, such as age, sex, intelligence, SES, native language, and a number of social variables, such as teacher factors, teaching materials and degree of urbanization. Data from studies of modern language teaching in native schools are compared with data from the bank of immigrant children, used in the preceeding two studies. Another comparative approach is the comparison between pupils of different nationalities and language groups.

The summaries of the papers presented here closely agree with the original papers with regard to "Problem", "Method", and "Results". The "Discussion" Parts have been elaborated, in two cases extensively, in order to be brought up to date with developments and findings from subsequent research.

Part I:

LANGUAGE TEACHING AND PSYCHO-PHYSICS

(SPRÅKPEDAGOGIK OCH PSYKOFYSIK)

(Pedagogisk Forskning, 1962, 6, 90-124. Co-author: K.-H. Eriksson.)

Experiments with early English teaching in Swedish primary schools made it necessary to construct tests suitable for the assessment of audio-oral skills achieved by pupils being subjected to purely audio-visual teaching. Pronunciation and listening comprehension were to be measured without employing reading and writing skills in the pupils. Pronunciation was to be measured globally rather than being divided into separate components.

METHOD AND RESULTS

One method of assessing pronunciation was derived from psycho-physical scaling procedures, in this case the method of limits or minimal changes. This method was preferred to the constant methods for practical reasons, and methods of reproduction did not seem feasible.

A total of 120 phrases were sampled at random from the course material with representative proportions of statements and questions. The scaling procedure began with paired comparisons of the pronunciation quality as rated by a team of ten native English teachers. An item analysis was then performed according to five criteria: inter-judge variation, ranking of pupils on single phrases in relation to overall rankings, number of tied ranks, most equidistant phrases, and representativity of length of phrases.

As a result, 12 phrases remained, each represented by 5 levels of pronunciation, ranging from very bad to very good pronunciation. Recorded pronunciations of the test phrases from a new group of pupils were judged against the scaled pronunciations by a group of three judges (psychologists with teaching competence in English). Inter-judge and test-retest reliability were found to be quite high, around .95. The rating by scales (method of limits) was compared to subjective over-all ratings on seven-point scales by the same group of judges (method of category rating). Inter-judge and test-retest coefficients were found to be almost as high with this method, .91. Analyses of variance gave an F-ratio of .32 for the method of limits while the F-ratio for the category rating was 4.39, p less than .025.

A listening comprehension test was constructed as a four-choice picture-selection test with sentences played back from a tape recorder. Conventional test construction methods were used. The split-half reliability, after Spearman-Brown correction, was found to be .82.

The rank correlation between pronunciation rated with the help of psycho-physical scales and listening comprehension was .33 (N = 34). The product-moment correlation between category rating of pronunciation and listening comprehension was .50 (N = 181).

DISCUSSION

Both methods yielded reliable measures of pronunciation. Good results have later been found with less sophisticated judges with the method of category rating. In view of the rather laborious work with the construction of psycho-physical scales, such as tape-cutting, paired comparisons and the actual use of the scales, the category rating method has been preferred in later studies as being more economical. The gain from the use of scales is that judges adjust to the same average level, as shown by the analysis of variance. The fact that judges tend to be more or less generous (error of leniency or harshness, respectively) does not seem to be a disadvantage as long as inter- and intra-judge reliability is satisfactory. The gain in economy is substantial, as the difference is months of work. With large groups of pupils, the category rating method is time consuming but possible, while the method of limits becomes virtually impossible as a tool for practical field work. The method of limits has demonstrated, however, that it is possible to achieve a very high degree of precision in the assessment of pronunciation.

The question of validity is more difficult to settle, as there is no better criterion than direct rating of actual pronunciation. Hence, it would seem as if content as well as construct validity must be better with direct measurement than with some kind of paper-and-pencil test which can only measure the pupils' knowledge of principles for pronunciation, not the actual achievement.

The method of measuring listening comprehension with played-back sentences and a multiple-choice picture selection test has been used in the later studies with immigrant children discussed later in this report. The reliability is fair, and even better results were obtained in the later studies. Again, the validity question is difficult to answer in the ab-

sence of a better criterion. Later experiences show that the main problem, as discussed in the present study, is to make this kind of test difficult enough to ensure dispersion and avoid ceiling effects. For instance, the recorded sentences need to be played back only once.

It seems that no better techniques for the assessment of pronunciation and listening comprehension have been advanced since the present study was performed, considering the requirements that early L 2 teaching and L 2 teaching for immigrant children present.

Part II:

MEASURING FOREIGN LANGUAGE ACHIEVEMENT IN THE AGES 7-10

(REPORT IN SWEDISH: MÄTNING AV SPRÅKFÄRDIGHET I ÅLDRARNA 7-10 ÅR)

PROBLEM

There were two kinds of rationales for the experiments with early English teaching in grades 1-4 in Sweden which started around 1957 and were continued until the end of the 1960´s. The first rationale, accounted for in the report, was Gorosch´s formulations of the arguments for an optimum in foreign language learning before puberty. The second rationale is the concept of "set", preparatory set or learning set, which is not discussed in the original report. The argument, however, runs as follows. The psychologists of the National Board of Education were, on the basis of evidence from developmental psychology, reluctant to accept too literal an interpretation of the early optimum theories (Norinder, personal communication). They believed, however, that there might be a good chance that early language learning should make later language learning more efficient. The theoretical basis for this belief was the set concept.

Learning set has been defined by Harlow (1949, p. 51) in the following way:

"The learning of primary importance to the primates, at least, is the formation of learning sets; it is the learning how to learn efficiently in the situations the animal frequently encounters. This learning to learn transforms the organism from a creature that adapts to a changing environment by trial and error to one that adapts by seeming hypothesis and insight."

And Harlow (ibid., p. 53) continues:

"We wish to emphasize that this learning to learn, this transfer from problem to problem which we call the formation of a learning set, is a highly predictable, orderly process which can be demonstrated as long as controls are maintained over the subject´s experience and the difficulty of the problems."

Harlow (ibid.) goes on to show by experiments with children and monkeys, that it is possible to obtain learning set curves with an increasing percentage of correct solutions over a number of problems in the same way as learning curves are obtained over a number of trials.

Hebb (1949) discusses set in terms of physiological psychology, defining it as an interplay of sensory stimulation and the autonomous activity of the cerebrum which constitutes a mechanism of selectivity in perception and thereby in learning. This is a way of explaining how later

learning can be affected by previous learning, and how a state of expectancy is produced in a learning situation. The theory is that learning arranges interconnections between groups of nerve cells in a certain way. The next time a similar situation is encountered, the prior organization makes the subject perceive one thing more readily than another. Perceptual set is exactly the same thing as attention, defined as a mechanism of selectivity. Expectancy occurs when the central facilitation is effective in advance of the sensory process (pp. 101-107). For a modern, technical discussion of attention and set, see Pribram (1971).

Hebb (ibid., pp. 109-139) discusses in great detail and very technically how learning early in life relates to learning at mature stages. In short, the argument is that while higher species, in particular man, are capable of a very complex, conceptual type of learning, maturation and learning in early ages is much slower than in lower species. According to Hebb, this may be explained by the fact that early learning is largely perceptual in nature, while later learning is associative. Man has the largest cortical association areas of all species. Associative learning can occur only when they have been "programmed", as it were, from the sensory cortical areas. As the A/S ratio, the relation between the size of association and sensory parts of the cortex, in man is high, the programming must consequently take longer. It would seem that the early programming is of the greatest importance for later cognitive functioning.

This way of reasoning is in fact parallel to that of Piaget, who also claims that early perceptual and motor learning is the basis of later cognitive functioning.

The audio-visual course, consisting of sound tapes and film strips, which Gorosch and Axelsson (1964) constructed on the basis of the first rationale, thus seemed to fit also the second rationale very well. The pupils saw the film strips with interesting situations, listened to the simple sentences and imitated aloud. There were no rules to be learned, no examinations to fear, just simple and amusing perceptual and motor learning in a relaxed atmosphere, the situation being designed to prepare for later, more formalized teaching.

METHOD

The instruction materials were in this version divided into 18 12-minute parts. The teachers did not intervene in the process, but functioned as operators of the apparatus only. No variations in method, or other teacher

variables, were thus possible. The pupils were given two exercises weekly during 18 weeks, the second one always being a repetition of the preceeding part of the materials. The course was administered to ten classes each in grades 1-4 in two dialectal areas. In one area a city L.G.A. as well as some countryside L.G.A.s were represented. The pupils were 7-11 years old and consequently all in the Piaget period of concrete operations. No, or very little, interaction between method and developmental stage can thus be expected.

RESULTS

Pronunciation was tested by letting the pupils imitate sentences, spoken by English voices and administered from a sound-tape in order to standardize testing conditions. The pupils' responses were recorded and evaluated in two ways, (a) by over-all ratings of each sentence by a group of judges, and (b) by ratings of the degree of similarity between narrow, allophonic transcriptions of the native speech sounds and the pupils' speech sounds. With both methods, scores for each phrase were summarized over phrases, yielding a total score for each pupil.

Listening comprehension was tested by letting the pupils say the Swedish equivalents to a number of items, each item consisting of an English sentence on sound tape, in some cases accompanied by a picture from the film strip.

All measurements were transformed into a 9-point standard scale in order to improve comparability and metric properties. The test values were plotted against quarter of year of birth. Tests of significance were computed for differences between grades and between dialect and urbanization areas.

Pronunciation measurements of both kinds as well as listening comprehension showed a monotonic, almost linear increase with higher age. Straight lines, obtained with the method of least squares, turned out to be a very good fit. A slight but regular curvature of a sinus type occurred in all grades. This tendency is difficult to explain, but might be accounted for by the time of the year of birth in interaction with the school situation.

Analyses of variance were conducted for one pronunciation measurement and for the listening comprehension measurement. The differences between grades are highly significant and the omega squares, .18 and .19 respectively, suggest that age explains enough of the variance to be considered as an important variable. The correlation between the two measures of pronunciation was $r = .73$.

The tests between grades show that differences between adjacent grades are sometimes, but not always, significant with both pronunciation measures and listening comprehension. Differences between grades that are one grade or more apart are always significant. In other words, the age trend is established with a high degree of certainty.

Children from cities acquired better pronunciation than children from the countryside, with both evaluation methods. Children from one dialectal area proved to achieve a significantly better pronunciation as measured with the more detailed method, but not with the over-all rating.

In disagreement with the Penfield and Roberts (1959) notion that there is no relationship between pronunciation and other language variables or cognitive variables, intercorrelations between pronunciation, general intelligence and listening comprehension are positive. The correlation between pronunciation (method 1) and general intelligence is substantial (.40). The correlations between listening comprehension and pronunciation 1 and 2 are .47 and .54, respectively or, in other words, substantial. In contrast, the correlation between general intelligence and listening comprehension is .23 only.

These results are by and large in harmony with those of Ekstrand (1976 a) who found that pronunciation intercorrelates substantially with other language tests and moderately with an R-factor test, and that listening comprehension correlates moderately with the R-factor intelligence test.

DISCUSSION

Age, L 2 acquisition and learning set

The idea of an optimal age for L 2 acquisition in the age range tested must be rejected. This finding is in agreement with Ekstrand (1976 b) who found an almost linear relation between age and language variables in the age range 8-17 for a very large group of immigrant pupils when plotting test results against thirds of year of birth. Foreign language acquisition ability seems to follow a similar course of development as that of the intellectual development in general.

The correlations obtained in this study, as well as those reported by Ekstrand (1976 a, 1977 a) between second language variables and intelligence are in the range .20 - .50. This range is the same as for correlations between L 1 and L 2 variables (Ekstrand, 1977 a; Skutnabb-Kangas & Toukomaa, 1976).

It is obvious from these findings, and also from those of Ekstrand (1976 b), that learning becomes more efficient with age. This conclusion is corroborated in a number of other L 2 learning studies, accounted for in Ekstrand (1976 b), but in which the age variable has not been used in such a finely graded and continuous way as in the present study or in Ekstrand (1976 b).

The present study, however, cannot be taken as evidence that the formation of learning sets does not facilitate later language learning. The type of study which compares early learners with learners without early experience after some time of simultaneous teaching would yield some evidence on this point. Ekstrand (1964) compared pupils with various amount of early training in grades 1-4 with pupils without such training after one year of regular English teaching in grade 5. Only small differences between the two groups were found, in agreement with a number of other studies, reviewed in Ekstrand (1976) which show that early training gives little advantage in later learning, or that the advantages disappear after some time.

The existing evidence, however, is not completely conclusive. In the first place, some contradictory results do exist, although such results as a rule come from less well designed and controlled studies or from anecdotal evidence. In the second place, the later teaching should build on and make use of the early training if it is to be of any value. Such a follow-up situation presupposes that the later teaching methods, materials and so on be adjusted to the pupils' previous experience. Such a continuous program is impossible in the experimental situation, however. The teachers in the late phase of the study must not know which pupils are experimental and which ones are controls. I once, in a small municipal unit, noticed strong signs of compensatory efforts from teachers who knew that their pupils were used as controls and wanted to show that their pupils could be as good as any. But also in the strict experimental situation where the experimental and the control pupils are mixed in the later phase, teachers' normal diagnostic set and their compensatory action may swamp the experimental variance. Keeping these research difficulties in mind, most studies seem to point to no differences between experimental and control pupils.

Thus, the existing empirical didactic evidence so far does not seem to support the notion of the value of the formation of learning sets. These data, moreover, gain strong support in basic studies of learning. Zimmerman and Torrey (1965) review in detail a Harlow experiment which clearly shows

that the formation of learning sets becomes more efficient with age.

Learning set and transfer

For a technical discussion of the formation of learning sets the reader is referred to Miles (1965), where the effects of qualitative and quantitative variations in reinforcement, problem length and number of other variables are discussed in terms of experimental data. Two results only from Miles' study will be mentioned here. The first is the stability of learning sets. After initial variability, learning set performance is very stable. Reliability coefficients for the performance on different days and for adjacent blocks of problems range from .80 to .96 and seems to be well over .90 in the final stage of set formation. Retention stability is also impressive. After about two months, no loss in performance was found in one experiment. In other experiments, about 90 % correct responses were obtained after 7 months of no training. All these experiments were performed with monkeys.

The second result to be mentioned is the fact that stimulus similarity seems to play a similar role in problem-solving as in simple stimulus-response conditioning. Miles (ibid.) reviews experiments that show that sets are formed more efficiently if problems have similar components in common. The greater the similarity, the more efficient becomes the formation. Monkeys use more than one stimulus attribute in the solution of problems. They also generalize color discriminations more readily than size or form discrimination.

Gluck and Harlow (1971) and Harlow et al. (1971) stress the theoretical and practical importance of not confusing the formation of learning sets with simple transfer effects of learning. An important issue in early foreign language learning experiments, therefore, is whether language learning involves problem-solving or just simple conditioning effects. It is obvious that both processes are involved. Clark (1976) points out that referential communication involves a good deal of problem solving, as it is often not quite clear what the referent is. Glucksberg (1967) has shown that referential communication develops as a function of age. It is also clear, even from a crude analysis, that the choice of words, expressions, forms and syntactical constructions in linguistic communication involves a good deal of categorization, discrimination and other kinds of problem-solving. It seems, therefore, that linguistic performance involves classical and instrumental conditioning and transfer effects as well as

problem-solving and other cognitive processes which might involve the formation of sets and transfer effects.

Recent experiments have shown that the formation of learning sets improve the cognitive capacity in a very tangible way. For instance, Rydberg and Arnberg (1976) used touch as an indicator of attention in problem-solving. In a series of learning-set studies, they found that adults can solve problems even if they attend to four dimensions in the same trial. Young children can attend to one dimension only, but after training even 6-year-olds can attend to four dimensions in the same trial. Thus, training in problem-solving of a rather limited nature (8 problems) may drastically improve the learning set.

Friberg (1975), using the same kind of apparatus as Rydberg and Arnberg, obtained marked transfer effects in conceptual training of mentally retarded subjects. Transfer was obtained in conservation of quantity, choice among "everyday situations" (pictures) and perceptual discrimination of a comparatively complex nature. This kind of transfer is rather impressive, as it was quite unexpected by the experimentators and the tasks are so different. The transfer seems to be related to the problem-solving strategies, rather than to similarity between components of the problems. Somehow the subjects seem to learn how to adjust their selective attention to new situations according to the varying requirements of the different problems. This in turn suggests processes on rather high a level of abstraction.

Such findings suggest that the training effects of language learning may be concerned with various abilities such as selective listening, speech motor training, visual perception, concept formation and associative learning with transfer effects to other domains of cognitive activities than second language learning. Likewise, second language learning may draw upon a number of seemingly unrelated cognitive functions. Such a state of conditions might explain why the course of development swamps the effects of early language training and at the same time resolve the apparent conflict between the belief in the importance of early stimulation and the negative findings of early L 2 training. Such propositions transfer the interest to two domains: possible effects of L 2 learning on the general cognitive development, and the problem of deprived versus enriched environments. In other words, even though early second language learning does not have marked effects in later language learning, it may still contribute to the general development of the individual and thus not be so useless as the negative results with regard to language learning indicate.

The effects of deprived and enriched early environments

A great number of studies on animals have yielded marked differential effects in the direction of positive effects of enriched environments. Gluck and Harlow (1971) discuss experimental conditions and review a number of experiments with animals. Enriched environments consists of ample space, extra stimuli such as geometrical objects of varying size, shape and color, apparatus for climbing and other activities, and access to several age mates. Deprived conditions consist of restricted space and no access to age mates or stimulus objects or apparatus. With dogs, enriched conditions have usually been to rear the dogs as household pets.

A large number of studies with rodents typically yield positive results for the enriched condition. The experimental designs, however, have as a rule allowed and even made probable the interpretation that the cause of improvement has been a transfer of specific response elements rather than a general facilitation of learning such as the formation of a learning set. However, a few experiments seem to have demonstrated general facilitatory effects. A number of studies have indicated that certain periods of age have been critical for producing the positive effects of the enriched environment, but as subjects always have been tested at the same age, the age of early experience has been confounded with the time between treatment and testing. Furthermore, effects have as a rule been found in certain tasks but not in others. Handling has proved to be an enriched condition which produces positive effects.

Experiments with dogs have usually yielded obscure results and the studies reviewed by Gluck and Harlow (1971) were all severely criticized by the reviewers. Apart from the usual confounding of transfer with formation of learning sets, some of the test tasks have been sensitive to stress influences, a condition often characterizing isolated dogs.

Research with monkeys has been extensive. Part of the research, however, has been carried out with imported animals and their pre-history therefore has not been completely known. Some experiments have resulted in slower action and other perseverative tendencies, but again, these results do not necessarily indicate altered intellectual capacity.

A number of explanations of the negative results of deprived conditions have been advanced. Gluck and Harlow (op.cit.) refer to the work of Riesen in 1966, demonstrating that deprivation of a sensory system (dark rearing) can result in atrophy or degeneration of this system, relieving the animal of neural substrata that may lie under particular sets of behaviors. Re-

lated research by Rosenzweig and coworkers has demonstrated that an enriched environment accounts for a large portion of increments in rats' brain growth and chemical activity as compared to deprived animals. It may be hypothesized that neural systems may be more or less developed at birth and that the external environment must contribute critical stimuli to complete neural maturation.

The Hebb (1949) view postulates that the organism early in life learns how to organize perceptual and motor responses. Failure of the rearing environment to provide critical experiences for such learning may permanently decrease basic perceptual-motor, emotional, social and information-processing responses. In summary, we find three kinds of experimentally supported theories: the atrophy, the underdevelopment and the learning deficit theory.

The perhaps most extensive experiments with early social deprivation are those performed at the Wisconsin Primate Research Center, as summarized by Harlow et al. (1971). Social deprivation was preferred to sensory and motor restrictions because of the dangers of atrophy or underdevelopment of the nervous system as discussed above. To cut an extensive summary and discussion of results short, no demonstrable impairment of learning set formation could be demonstrated:

"The results of these experiments raise serious doubts that differences in early, preadolescent environments leave any long-term effect on learning or intellectual capacilities. On only one measure was a group of environmentally enriched monkeys superior to monkeys raised in either moderately deprived or extremely deprived conditions, and on the other measures the enriched monkeys were frequently inferior to those suffering extreme social deprivation." (p. 146)

"It is our belief that the previous experimenters were wrong in assuming that social deprivation debased subsequent learning ability. As of the present time the only conclusion that we can draw is that early environments greatly alter emotional and personality variables but have little or no effect on learning or intellectual variables." (p. 147)

Harlow et al. (ibid.) severely criticize some of the research on early environment (p. 146):

"There now exists a wealth of intellectually poverty-stricken literature which shows that any knowledgeable experimentator who wishes to demonstrate that mammals raised in enriched environments are intellectually superior to those raised in deprived environments can achieve this goal. By conforming to simple fundamental laws of human stupidity this is easily achieved by some investigators using simple experimental designs and by others using experimental designs that they conceive to be recondite. The cheerless thought is that the experiments were created by human beings themselves reared in enriched environments, proving only that enriched environments alone are not adequate to facilitate thinking."

Now, these harsh words may have been a little hasty. In the first place, restricting the deprived conditions to the social domain only seriously limits the generalizability of the research. The argument for doing so is not convincing. There are nuances between complete sensory deprivation with risk for neural degeneration and no deprivation. An intermediate level of restriction might have been chosen in order to introduce cognitive deprivation as an independent variable related to the criterion variables. In spite of numerous claims of the opposite, most empirical studies seem to show no or very slight relationships between cognitive and affective variables (Ekstrand, 1976). Only in extreme situations of traumatic experience, prolonged conflict or strong stress arousing the autonomic nervous system are cognitive variables lastingly affected by emotional response. In particular, in depressive states, perceptual and cognitive functioning is usually adequate (Zimmer & Foy, 1963), according to their review of the clinical literature. Therefore, social deprivation alone does not seem to be a sufficient condition in order to test the effects of a deprived environment on cognitive functions.

Furthermore, shortly after the publication of the quoted conclusions and the quoted criticism, Harlow had to admit that a deprived environment can produce effects on learning in monkeys (Harlow, Harlow & Suomi, 1971). The differences between deprived an enriched monkeys appeared on the most complex problem-oddity-learning set (.001 level of significance). As Harlow et al. (op.cit.) assert, the reason for this sudden difference in learning capacity (there was no progressive increase in differences with increasing complexity of tasks) is by no means clear. The finding does add another item to the general picture of the relation between the affective and the cognitive domain. Within a wide range, the two domains seem to be unrelated. Moderate emotional disturbance does not seem to affect cognitive functioning, nor does cognitive achievements seem to alter the emotional state. Outside this range, the impact from one domain to the other appears suddenly and as a rule drastically (Smythies, 1970; Pavlov, 1960). This seems to be true for man and a number of other species.

A number of compensatory educational programs in the U.S.A., including "Head Start", "More Effective School" and "Follow Through", have largely been failures (OECD, 1971). The interpretation of these findings is that the problem is just not that certain groups get low results in school as a consequence of a deprived or restricted environment. The problem has deep socio-economic roots.

There is at least one compensatory program which has succeeded, however, the "Milwaukee Project" in Wisconsin. The starting point was the fact that about 80 % of the mentally retarded (below IQ 75) in the U.S.A. do not present demonstrable pathology in the structure or the functioning of the nervous system (Heber et al., 1972). A survey study revealed that maternal intelligence is decisive for the development of intelligence in the child. If the mother has an IQ below 80, about 80 % of the children also fall below this value, i.e. they are a high risk group.

An experiment was started with 20 control and 20 experimental children with an intensive compensatory program, including maternal rehabilitation in the experimental group. The control group was exposed to no other treatment than the test administration at certain intervals. Within the general frame of a day care center, the experimental children received an individualized training aiming at development in the content areas of perceptual-motor training, language, reading, mathematics and problem-solving and socio-emotional factors. Extensive teacher training was provided before and during the program, which lasted from infancy to the age of six (Heber et al., 1972).

At the age of about two, the intelligence curves stabilized. The mean IQ for the experimental children fluctuated around 120, while the controls levelled out at about IQ 95. Both these values are unexpectedly high. The upper value may be explained by the enriched environment, as may in fact the lower. Neither the children nor the mothers were unaffected by the testing program and the interest in the children´s development. The differences between groups remain after about three years of regular schooling, after the end of the intervention program (Garber, 1977, personal communication).

The main differences between the Milwaukee project and Head Start and all other compensatory programs seems to be that the Milwaukee approach is virtually one that creates learning sets, while the other approaches more or less consciously seem to build on a transfer thinking. As Garber and Heber (1974) put it:

> A major part of our concern for the cognitive development of children was to minimize the technique of simply identifying and providing children with those facts which are the supposed elements for success in school. We wanted the children to be able to act spontaneously whenever the situation changed, so we emphasized thinking creatively as well as providing the child with a basic age-related repertoire of responses". (p. 7)

From the basic research on animals and the applied research on children with enriched environments, two working hypotheses seem to emerge with

respect to language teaching. The first is that the instruction in a second language must more consciously be aimed at creating learning sets. In other words, the children must learn how to use the words and phrases they learn in various practical situations. Second language teaching typically aims at creating transfer, i.e. to teach the children to pronounce, read and spell correctly, to learn to speak and write grammatically correct. The class situation effectively prevents practical exercises.

The second conclusion is that language is content and not only form. In other words, language is used to express the thoughts, i.e. the cognitive processes of the individual. If these processes do not develop, language obviously cannot develop either. Therefore, it would from the enrichment research on animals cited above seem as if children should be subjected to a learning set development strategy in all respects of their cognitive development. Again, the school situation, including second language teaching, typically focuses on basic learning, to some extent on transfer effects and hardly at all on training in problem-solving and the application of the pupils´ knowledge and problem-solving capacities in new situations.

A close connection between native language development and cognitive development was achieved in the Milwaukee project. The two major emphases of this project was (1) cognition and (2) language (Garber & Heber, 1974). Cognitive and language training took part simultaneously and in so close contact with each other that the two emphases were actually part of each other. The personnel was chosen so as to be "language facile and affectionate" (op.cit., p. 6). In this setting, the children were subjected to an extensive program designed to develop general cognitive and perceptual skills.

Today, evidence is piling up supporting the notion of a complex interrelationship between cognition and language (Ekstrand, 1977). Particularly relevant is research on early learning in infants and especially on the interaction between mothers and children. It has been demonstrated that the parents, and in particular the mothers, are the main mediators between the child and the environment. The teaching strategies of the mothers affect and mould the educability of the children (Hartman & Haavind, 1976). The mothers´ mode of instruction and their ability to adjust their instruction according to the children´s performance on a construction task strongly affected the children´s development of problem-solving ability (Middleton

& Wood, 1976). A similar adjustment of mothers´ speech to their babies, reflecting their children´s growing ability to function as conversational partners, has been demonstrated for two mothers with babies between 3 and 18 months by Snow (1976 a).

The role of the cognitive processes in the development of speech has been demonstrated by Clark (1976), pointing out that linguistic processes involve a good deal of problem-solving, in that the listener must infer the referents of many words, and by Glucksberg (1967) who has demonstrated that referential communication develops with age. Bruner (1976 b) also, in his studies of the transition from the pre-linguistic to linguistic modes of communication during the first two years of life, concludes that communication involves problem-solving and that communication is a means to achieve and end. Lorenz (1974) and Hebb (1949) have both pointed out that language to a very great extent consists of spatial analogues. Thus, it becomes almost self-evident that "the child´s knowledge of language is deeply dependent upon a prior mastery of concepts about the world to which language will refer" (Bruner, 1976 a, p. 266). This was also demonstrated by Halpern and Aviezer (1976), who showed that object permanence as defined by Piaget appears before the appearance of linguistic structures such as verb-related constructions (agent-action, action-object). Such findings make the idea of Chomsky, Lenneberg and McNeil that linguistic rules are innate and develop independently of intelligence appear to be an extreme position (Halpern & Aviezer, 1976, pp. 1, 13.)

Some early research on the effects of deprived environment on language and cognition is of interest in this context. McCarthy (1954) has reviewed research on the effects of institutionalization and is struck by the observations of how early language deficits are manifested, already in the amount of crying, and how lasting they are. Early research also reveals the SES effects that are so much emphasized today. Interestingly, McCarthy (op.cit.) finds that traveling and other events that broaden the child´s experiences are followed by an increase in vocabulary. This is an agreement with Kantor´s (1965) findings that moving once or twice during childhood is associated with increased cotnitive capacities, while excessive moving as well as being stationary may have detrimental effects. There is also an association between the early language manifestations in children and general intelligence. For instance, there is a correlation of -.41 between onset of speech and later IQ. Jones (1954) has reviewed early research on environmental factors and cognitive development and discusses the well-known findings by Gordon (1923), Husén (1951), and others, showing clearly

the environmental effects of isolation, schooling and other social factors on intelligence measures.

Also pertinent in this context is the question whether early second language training is harmful or not. Malmberg (1971, 1977) has repeatedly argued that such training is harmful if started "before the native language is established". In view of the fact that native language development seems to go on throughout life (Diller, 1971, p. 29), this starting point seems a bit difficult to establish. Also other authors have raised the question of the possible harmfulness in early learning (Green, 1977) in general.

Borger and Seaborne (1966) review all the classical research on, for instance, tadpoles who were allowed to swim or not, children who have been allowed to crawl in staircases and not, the swaddling of Hopi and East European children, and so forth. All these studies reveal no harmful effects of early training or restriction, but show that differences vanish with time. More recently, however, Pikler (1971) has suggested some harmful effects of too early training of walking in infants.

Little research seems to have been carried out on the interaction effects of early L 2 training. No harmful effects were reported from the extensive experiments of the Swedish Board of Education during the late fifties and the sixties. In fact, positive social and emotional effects were reported when the audio-visual course was introduced into special classes. Donoghue (1965) reviews research on the effects of the early FLES experiments on the general academic achievement and found no harmful effects. Johnson et al. (1961) in one study finds no serious effects on academic achievement and Lopato (1962) makes a similar observation. Geigle (1957) also draws the same conclusion in agreement with Potts (1967) and Smith (1967).

Malmberg (1971) argues that his apprehensions concerning early L 2 training are particularly strong in the case of pupils in special classes. This suspicion is partly borne out in the research on early English teaching in Denmark (Florander & Jansen, 1969). Special class children with early English teaching were clearly inferior in written tests in Danish to special class pupils without such training, and no other explanations could be found. The authors conclude that "harmful effects cannot be excluded" (p. 52). No such effects could be traced in pupils in ordinary classes.

However, it would seem that the Danish experiences are due to a less suitable didactic approach. While no formal studies of harmful effects were carried out in the Swedish experiments in special classes, the communica-

tions between the teachers and the local supervisors and them and the Board of Education were so intense that any negative consequences would have been heard of. The explanation that I would advance is that the Swedish method of instruction was completely oral-aural, while this was not so in the Danish experiments. A slight change in procedure would probably eliminate the risks for interference in writing the native language in special class pupils.

Previous research on "harmful effects" does not seem to be completely conclusive. The critics of early L 2 teaching should specify in which variables such effects might be expected and by what mechanisms the effects would come about. The negative effects should be weighed against the positive effects and if possible eliminated by an appropriate choice of method. In fact, the positive effects in the Swedish experiments were so pronounced that it was decided that the curriculum in the comprehensive school should basically be the same for pupils in regular and special classes.

For pupils in the type 2 situation, i.e. immigrant pupils, another mechanism might operate. The acquisition of a foreign language seems to take longer time and the deterioration of the native language is a faster process (Toukomaa, 1975). Thus, there might be a more or less prolonged period of retarded language development. While the mechanisms for language acquisition and deterioration should be further studied and diagnostic methods developed, for instance along the new and interesting lines of the research of Stankowski (1977, personal communication), it could be surmised that didactic measures taken to improve the cognitive development should prove helpful in speeding up the acquisition of the new language and prevent the deterioration of the old. Such attempts have recently been launched, for instance by Heron and Kroeger (1974).

Further evidence for the cognitive nature of language

The spatial analogies in language have attracted the attention of many scientists. For instance, Hebb (1949, p. 118) writes:

"Consider again the role of analogy in human thought, and the figures of speech that betray it even in scientific work. The pons and island and aqueduct of cerebral anatomy; the wave of sound and cycle of sunspots in physics and meteorology; the rise of the blood-sugar level, and the limen of stimulation in physiology - all these are as enlightening, concerning the nature of learning and intelligence ... Such figures of speech are at the very least an aid to memory; even when it has a totally new reference, the familiar term is more easily recalled than a neulogism. Using it is therefore more than an economy of language. The underlying analogy with

something already known is an economy of thought as well, an economy of effort in learning and understanding."

Also Lorenz (1974, p. 167) has made similar observations and quotes Porzig:

"Language translates all conditions of a non-imagery nature to spatial conditions. And it is not only one language or language group which does so, but all, without exceptions. This peculiarity belongs to the invariant features of human language. Time relations are constantly expressed in a spatial way: before or after Christmas, within two years. Concerning mental processes we do not only speak of outside and inside, but also of 'above and below' the threshold of conscience, of the subconscious, of figure and ground, of deep and layers of the mind. Space pervasively serves as a model for non-visual relations: besides working, he also teaches, love was bigger than ambition, behind these measures the intention was hidden - it is quite unnecessary here to pile up examples, as one can gather any number from every instance of oral or written language. --- It is not only found in the prepositions, which all originally denotate spatial conditions, but in verbs and nouns as well."

Strømnes in a series of studies (1973, 1974 a, b, c, d, 1976) maintains that people of different cultures perceive the physical world in different ways, and that language reflects such perceptual and conceptual differences. For instance, different ways of patterning cloth, of describing ice-hockey games, of erecting buildings reflect cultural differences between Sweden and Finland. These differences are reflected in the languages, which belong to different language families. Also other researchers, such as Moeser and Bregman (1973), who have shown that early syntax learning should be mediated through an understanding of the reference field, tend to relate linguistic and spatial variables. Nyman (1926) has demonstrated the pervasive and enduring influence of spatial analogies in philosophical scientific work.

Effects of L 2 learning on cognition

We would, a priori, expect general cognitive factors to be of greater importance for L 1 and L 2 learning than vice versa, simply because language constitutes one of many sets of variables involved in cognitive development. However, also empirical evidence contributes to this conclusion, such as recent findings about concept formation being developed before the corresponding linguistic code, problem solving processes involved in language and the great amount of spatial analogies in language. Also neuro-linguistic and neuro-psychological evidence seems to support this view.

The conclusion cited also seems to be borne out by existing research on bilingualism and intelligence. Early studies used to show superiority in intelligence for unilinguals. When nonverbal measures of intelligence were being used, the difference tended to disappear and, in particular when SES

was controlled for, sometimes went in the favour of the bilinguals. Some recent experiments seem to indicate superiority for bilinguals in problem sensitivity and portrait sensitivity (Bain, 1974), in separating words from their meaning (Ianco-Worral, 1972), and in sensitivity for communicative needs (Genesee, Tucker & Lambert, 1975).

However, differences, although significant, are not large. The association between intelligence and bi- or monolingualism, therefore, is not very strong, which would show as low correlations between the dependent and independent variables, were such measures used. Furthermore, as pointed out in the introduction to this report, results from this type of research are obscured by the fact that subjects typically are not assigned at random to the different experimental conditions.

On the basis of the preceeding analysis, we would expect L 2 learning to follow a course similar to that of general cognitive development as shown by Bayley (1955). Provided one employs appropriate methods of instruction and measurement, we hypothesize that it would be possible to improve L 2 teaching, not to the extent that the developmental course is levelled out, but at least to the extent that significant differences in favour of an experiment group will appear, and persist for a long period of time.

In stating that the direction of causality as reflected in the correlation between language and cognition is stronger from cognition to language than vice versa, I do not deny that language contributes to cognition by, for instance, supplying labels and thereby increasing the precision in thinking. Language is a powerful in- and output means to the mind as it were. There are, however, other in- and output systems besides language, e.g. non-verbal systems of communication. There are also other ways of thinking than by language, for instance by imagery. One outstanding example is Nikola Tesla (who has given his name to the SI unit 'tesla' /T/ for magnetic induction). In his memories (Tesla, 1977) he describes his remarkable powers of imagery and says (p. 13):

"When I get an idea, I start at once building it up in my imagination. I change the construction, make improvements and operate the device in my mind. It is absolutely inmaterial to me whether I run my turbine in thought or test it in my shop. I even note if it is out of balance."

In the case of L 2 the direction is so much more obvious as L 2 in most cases is not learnt until the cognitive structure is stabilized.

Summary and synthesis of the discussion

The research reviewed in this section indicates that the hypothesis of an optimum for L 2 learning must be rejected for the age range investigated here. The hypothesis of learning set formation cannot well be tested with the kind of design employed. A follow-up study by Ekstrand (1964) suggests that the effects of the early teaching are small, in spite of the greater amount of teaching which the experimental children have enjoyed. This is in agreement with most other studies, reviewed in a later section. Part of the explanation of the findings reported here is that the ability to form learning sets, not only S-R learning, increases with age. Part of the explanation is also that methods of language instruction do not aim at learning set formation but rather at simple conditioning and transfer effects. In other words, teaching procedures should aim at problem-solving situations, i.e. the application of the language skills in a wide repertoire of situations, without corrections and other kinds of creativity-inhibiting surveillance.

As we know from other research, for instance that of Thorndike et al. (1928), also other domains of learning improve with age. Being in agreement with both learning set theory and developmental psychology, we find ourselves caught in a paradox, viz. because of the findings of the importance of early environment, as clearly indicated by early deprivation studies and more recently by the Milwaukee experiment.

One solution of this paradox might be that some early language experiences may be of a learning set-forming nature. This seems to explain the success of the Milwaukee project in contrast to other recent enrichment programs. Consequently, attempts to measure the effects of early language training should aim at the development of tests of the creative aspects of language and also of the effects of L 2 learning on cognition. This is provided that the teaching methods can be developed in the direction suggested. In harmony with the learning set theory, much of the psycholinguistic research on native language functions today is focused on the creative aspects of language, which seems very adequate.

The association between L 2 and cognitive factors indicated in much experimental research is clearly demonstrated in the present study. Even the rather specific L 2 variables of pronunciation and listening comprehension show a small but definite relationship with general intelligence in the terms of Guilford's (1956) verbal interpretations of correlation coefficients.

The design employed has turned out not to be appropriate for testing the hypothesis of the formation of language learning sets. It does, however, test the hypothesis of an early optimum. No such optimum is found in the age range tested. The failure of most studies to demonstrate lasting and substantial effects of an early start on L 2 learning, which is discussed in detail in connection with the next paper, suggests that learning set formation is not achieved. The findings of the Milwaukee project, in harmony with results from basic research, suggest that such formation is possible. Such a conclusion is also supported by the results of Rydberg and Arnberg (1976) and of Friberg (1975). There are obvious implications from this discussion for practical teaching procedures.

L 2 learning seems to follow the general developmental course in children, in agreement with the findings of Thorndike et al. (1928) that second languages, mathematics, history and other subjects are learned better with age. While it is not suggested that this course can be completely altered, it is suggested that more appropriate teaching procedures should be able to produce more lasting results from early L 2 teaching, in addition to the obvious need in native and immigrant children in all ages to have one or more foreign languages at their disposal. The "harmful effects" of early L 2 learning seem to be small or non-existent, particularly in comparison with the positive effects.

Part III:

AGE AND LENGTH OF RESIDENCE AS VARIABLES RELATED TO THE ADJUSTMENT OF MIGRANT CHILDREN, WITH SPECIAL REFERENCE TO SECOND LANGUAGE LEARNING

(In: Proceedings of the Fourth International Congress of Applied Linguistics. Stuttgart: HochschulVerlag, 1976.)

PROBLEM

A number of explicitely formulated theories predict an optimum for second language learning in early ages. Penfield and Roberts (1959) advance the plasticity theory, predicting an optimum between 4 and 8. Donoghue (1964) asserts that the ability to imitate audio-orally is better in young children than later in life. Lenneberg (1967) has advanced the critical period theory and the associated resonance and lateralisation theories, all predicting that L 1 and L 2 learning can take place between onset of speech and onset of puberty only. During the critical period second language learning is more or less automatic, while after this period it becomes inefficient and laborious.

A number of research studies yield contradictory results. Those in favor of the optimal age theories are either anecdotal or afflicted with experimental shortcomings, while those yielding opposite results as a rule are of better quality. None of the studies contradicting the theory is designed to reveal with certainty a possible optimum, however. An interval of several years may hide an optimum in spite of the later age showing significantly better learning ability than the younger age. Language measurements must be plotted against a finely graded age continuum and the number of individuals must be large enough to give reliable estimates of every point of the function.

METHOD

By writing to all L.G.A.s in Sweden, all immigrant pupils who in the spring of 1966 were in need of special tuition in Swedish and also given such tuition were identified. Test data and back-ground data were obtained for about 90 % of this population. There are missing data in one or more variables for most pupils for a variety of reasons, but a number of statistical checks failed to reveal systematical tendencies of the missing data. There were six functional language tests, three reading tests and

three intelligence tests and teacher ratings of social, emotional and school adjustment.

Further checks in addition to those reported in the paper show that 766 (87.1 %) out of 880 correlations (Cramér's statistic) between missing test data and 40 background variables were between 0 and .19. Out of 1,600 correlations between missing background data and background values, 85.9 % were between 0 and .19. All higher values turned out to be due to "natural reasons", e.g. younger pupils not having intelligence test results, due to lack of suitable tests for this age range. In other words, there seems to be no systematic tendency for missing data apart from reasons already known and which can be made allowances for.

RESULTS

By computing contingency coefficients between a number of background variables, it was found that age is strongly correlated with grade only, Table 5. LOR is strongly related to "Previous knowledge of Swedish" only. Age is uncorrelated with LOR. Age and LOR may thus be studied independently, and there is no need to control the other background variables studied.

The pupils were grouped in 26 groups according to third of year of birth. 1 = born 1949 or earlier, 2 = born January April 1950 (16: 1-4 years at the time of testing), 3 = born May - August, 1950 (15:9 - 16:0), etc. The age group means from the four domains, i.e. adjustment assessments, language, reading and intelligence tests, were plotted against age. Analyses of variance were used to test the significance of the trends.

In the original paper (Ekstrand, 1976 b), the curves for five variables only are given, due to space limitations. Here, curves for the sex language variables, three measures from the third oral reading test, the three intelligence measures and the four teacher assessments are presented in Fig. 1. As is clearly shown, reading skill as well as L 2 learning follows the non-verbal cognitive development. There are ceiling effects in some tests, as they tend to be too easy in higher grades (for discussion, see Manual, Ekstrand, 1974).

The adjustment assessments are unrelated to age. "Progress in school" is negatively and significantly related to age, but the ω^2 value indicating the relation between the independent and the dependent variable is very low. The ω^2 values for language, reading and intelligence tests are all well above the conventional, arbitrary limit of .05 and are in

many cases substantial. Apart from the R and N factor tests (Thurstone classification) and Free Oral Production, all test results are positively and significantly related to age. When ANOVAS for extreme age groups were computed, the R and N factor tests too showed a positive and significant relation to age.

To test the effects of LOR, the pupils were grouped in thirds of year of residence. Group means for the tests were plotted against LOR. ANOVAS were computed. All ω^2 values are very low, except Free Oral Production with a value of .22. Listening Comprehension is just above the .05 criterion and Free Written Production almost reaches it. The adjustment assessments are unrelated to LOR. All language and reading tests are positively and significantly related to LOR (except number of words read, for all the three reading tests). Most of the pupils had a LOR within 2 years.

DISCUSSION

The age effects of this study strongly support those of the previous study. In addition to the theories of an early L 2 optimum, mentioned above, these theories might be added: the two-type learning theories (Anderson, 1960; Ervin & Osgood, 1965; Ellegård, 1971), which all presuppose two different kinds of L 2 learning and also predict an early optimum, and the psycho-dynamic theories (Stengel, 1939; Curran, 1961; Guiora et al., 1972 a, b; Schumann, 1975), predicting difficulties in L 2 learning after puberty because of too strong super-ego control. Rosansky's Piaget based developmental theory should also be mentioned, which states that the restructuring of thought in the formal operations period should be an inhibiting factor for L 2 acquisition (1975). A recent approach is the limbic system theory (Walz, 1976), which places certain language functions, viz. accent and grammar, in the limbic system or, more specifically, the thalamus. That there indeed are lateralized thalamic language functions is borne out by experimental research (Penfield & Roberts, 1959; Ojemann & Ward, 1971). The thalamic functions seem to be developed around the age of four, which leads Walz to the conclusion that a child picks up an accent easier than an adult (p. 105). In fact, all theoretical approaches seem to agree upon an early optimum, also the most recent ones, and to disregard the accumulating contrary evidence.

It must be admitted that the empirical evidence still seems contradictory. In addition to the research reviewed in the present paper, the following studies should be mentioned. Dryer (1956) compared college

freshmen taking French with and without experience of French in elementary school and high school and found the first group to be superior. The evidence is only anecdotal, however. Justman and Nass (1956) performed similar comparisons in high school with pupils taking French and Spanish. The pupils with and without prior experience were matched on sex, age and IQ. Results with the French groups were contradictory and insignificant. Results with the Spanish groups showed a significant difference in favor of the experimental pupils, but this difference did not persist beyond the first semester of instruction. Both studies mentioned confound starting age with the total amount of instruction, which is much larger for the experimental groups.

Ginsberg (1960) claims that pre-school children learn a foreign language "much more rapidly, better and more permanently than children of school age" (p. 24), but the evidence is anecdotal only. Larew (1961) reports a small experiment in pronunciation with only ten children of various age. Results after only four lessons yielded inconsistent results. Grinder, Otomo and Toyota (1962) compared grade 2, 3 and 4 children who had studied Japanese for a year with respect to vocabulary, comprehension and nine articulatory variables, basic to Japanese speech. Higher grade was significantly related to better results in comprehension, silent vowels, t and ts, while a trend appeared for vocabulary and d. In six out of eleven variables, children thus did significantly better in older ages.

Vocolo (1967) reports another comparison of students with and without a FLES experience in French. The controls were matched with the experimental students on intelligence, academic achievement, sex, SES and physical health. In listening, writing and speaking tests the experimental students were significantly superior to the controls, while a tendency to superiority in reading was not significant. This study is a very well-controlled one, but again confounds starting age with amount of instruction. The comparison was made after two years of study, but should have been followed-up to check whether the results were persistent.

Burstall (1970, 1975 a, b) compared students starting with French at two age levels, 8 and 11 years. "Pupils taught French from the age of eight did not show any substantial gains in achievement" (Burstall, 1975 a, p. 195). "When experimental pupils were compared at the age of 13 with control pupils who had been learning French for an equivalent period of time, but were, on average, two years older, the control pupils' performance on each of the French tests were consistently superior to that of

the experimental pupils" (Burstall, 1975 a, p. 21). The tests were reading, speaking, listening and writing tests. It was further found that amount of instruction plays a major role, but that age tends to outweigh the length of the learning period around the age of 16. This experiment does not suffer from the weakness of unequal amounts of instruction. It also speaks against the idea of learning set formation, but was not designed to test this particular theory.

Bratt (1975) claims that L 2 learning is more efficient in early years but gives only anecdotal evidence. Doyé (1975) and Doyé and Lüttge (1975) compared the effects of starting English in grade 3 with start in grade 5. Around 2,000 pupils started in grade 3 and 500 pupils were selected as controls in grade 5. The pupils were equated with respect to intelligence, arithmetic and spelling, as well as SES. In grade 5, the experimental pupils were superior on all tests. In grade 6, the differences have diminished and the experimental pupils were superior on four out of six tests. The results from grade 7 have not yet reached me.

Carroll (1975) found inconsistent results when comparing the effects of age across and within eight countries. In population IV (preuniversity students) time factors were unclear, due to restricted variability. In some countries years of French showed great variability and was found to be a strong predictor of later success in a negative way. This finding is ascribed to the tendency of brighter students to advance faster in school. When variation of starting year for French was studied, most t-values were insignificant, with the exception of Sweden and the U.S.A., where the tendency was strongly positive, i.e. the later the start, the better the results. In general it might be said that the population IV results contradict the hypothesis that early language teaching is advantageous.

In population II (14-year-olds) age is a weak but not significant predictor. In the comparison of grade for starting French, no t-values reach significance. In the U.S.A. a t-value of 2.40 approaches significance in a negative direction and thus supports, to some extent, the early age hypothesis. The cautious over-all conclusion drawn by Carroll, however, is that the data of this study do not support nor contradict the early age hypothesis. The results might, however, be interpreted as supporting those studies which show that the possible advantages with an early start tend to disappear over the years, cf. Durette, 1972.

Lewis and Massad (1975) find in their study of English as a foreign language in ten countries that the amount of instruction is an important

time factor. In countries where English starts very early, such as Sweden, this factor tends to be less important, however. In these countries other factors, such as motivation, interaction with English-speaking people, etc., tend to gain in importance. In population II, grade is a potent positive predictor. In population IV, grade is a negative factor, i.e. younger students tend to be better learners. However, the authors point out that this may be accounted for by selection factors. The older students in the pre-university grade may be repeaters or slow learners. Thus, the finding in Carroll's study (op.cit.) that the brighter students often are young, reappears in this study. In many countries English is the third language and in some cases the population IV students have ceased studying English. In short, the inconsistent age results from the IEA studies seem to stem from the fact that they were not primarily designed to test time factors, at least not age factors.

The earliest systematically collected data seem to be the two studies reported by Thorndike et al. (1928). The first study was a questionnaire which showed that adults above the age of 40 judged second language learning to be more difficult than did adults below the age of 40. This tendency was stronger for speaking than for reading. Thorndike, however, suspected the results to be due to lack of confidence in the own ability rather than a real diminishing of ability. He therefore undertook an empirical study of the learning of Esperanto by individuals, ranging in age from 8 to 57 years. The tests were Vocabulary, Ability to carry out oral and written instructions and Reading Comprehension. Unfortunately, the Ss were distributed in a large number of subgroups of varying time of instruction, age, intelligence and so forth, so no plots can be made. Crude comparisons between children and adults may, however, be reliably carried out. Adults above 35 showed a massive superiority over children of 8-10. The difference is obscured by the fact that almost all of the adult Ss were college graduate or under-graduate students, but probably holds true nevertheless.

Seliger, Krashen and Ladefoged (1975), using a questionnaire technique, found that the younger immigrants are at the time of arrival, the better is their self-rated accent. Krashen and Seliger (1975) found a similar tendency for the acquisition of a second dialect, using the same method. Unlike Thorndike, they did not check their Q data with experimental techniques, so the results do not seem dependable.

Snow (1975, 1976 b) studied 41 English-speaking children during their

first year in Holland. An extensive test battery was used at three different occasions. The Ss ranged from 3-15 years of age, and were for analysis divided into four age groups. In addition, ten adults were tested with the same battery. In all tests, older Ss performed significantly better than younger ones. The adults performed equal to or slightly inferior to the 12-15-year-olds, but had been exposed to Dutch to a lesser degree.

The last mentioned study on immigrant children support the evidence from my own study. It is particularly interesting, as it covers an age range which starts very early. However, the small number of Ss and the necessary division into four age groups makes it uncertain if the design can reveal the presence or absence of an optimum.

Generally speaking, the age studies may be divided into three groups. The first is studies designed directly to measure L 2 learning ability in different ages, such as Thorndike´s, Snow´s and my own two studies. The second type is those which compare different starting ages after some time of regular teaching. The type 2 studies all confound age with amount of instruction. Most of the studies belong to this type. A third type compares pupils with different starting ages after an equal amount of instruction. Burstall´s, Mylov´s, and the EPÅL studies belong to this type.

The data from the best designed studies generally support those of the present study, viz. that older individuals learn a second language better than younger ones. Thus most empirical evidence seems to contradict the remarkably unanimous theories. Furthermore, no optimum seems to exist. Toukomaa ascribes the developmental tendency to the pupils´ better mastery of L 1. However, as will be discussed in the last paper, general cognitive factors seem to contribute at least as much. Probably, perceptual and psycho-motor factors contribute as well. Thus, the biological, psychological and educational theories should be rejected in favor of a developmental theory.

While few people would think of the idea of postponing the school start until the age of twelve, this is actually suggested by Toukomaa and Skutnabb-Kangas (1977, p. 67) and Malmberg (1977), as far as L 2 learning is concerned. By analogy, one could also recommend the postponement of the study of other subjects, as they are all learned better at older ages than at the time of the school start at five, six or seven, as the case may be.

The argument of those who recommend that second languages should not be

formally studied until the age of 12-13 is not only, however, superiority in learning capacity with increased age. It is also claimed that the native language is not stabilized until then. As pointed out elsewhere in this report, several studies have shown that the correlations between L 1 and L 2 are only moderately strong. Furthermore, there seems to be no proof whatever that twelve is a more suitable age than any other. As suggested by Mikeš (1974) the phonology of the native language(s) seems to be acquired by the age of three, a conclusion that gains strong support by research cited by Menyuk (1971) and by the research done by Jenkins (1972). On the other hand, abstract thinking as defined by the ability to carry out formal operations, which certainly is important for language development, is not fully developed until <u>after</u> twelve (Furth, 1969; Elkind & Flavell, 1969; Andersson, 1973) and is highly individual, depending on the development of general intelligence. As Diller (1971) points out, language development continues throughout life.

A third argument is the "harmfulness" of L 2 learning before twelve. As pointed out above (p. 35), this problem was studied during the FLES era and no such general effects were found. Jansson and Lindén (1974), as part of the EPÅL study, investigated the early learning of a third language in immigrant children. They give some preliminary results in Swedish, English and arithmetic for 1,664 children in grade one, 264 of which were immigrant children born in Sweden and 86 were immigrant children born abroad, and the corresponding results for the same children in grade 2. Some results are given in Table 4, along with some results of the grade 3 controls.

<u>Table 4</u>. Some preliminary comparisons between Swedish and immigrant children within an early English project (EPÅL). Experimental children (E) are compared with total group.

	Math	Sw_D	Sw_{E_D}	Sw_{RC}	$Sw_{E_{RC}}$	$Engl_{MS}$	$Engl_{ES}$	
					Grade 1			
Sw	4.9	6.0	6.1	6.2	6.2	4.6	4.6	
IN	4.7	5.9	6.0	6.0	5.9	4.8	4.5	
IF	4.0	4.5	4.9	5.6	5.7	4.9	4.1	
					Grade 2			Controls grade 3 Engl
Sw	4.7	4.8	4.9	5.0	4.9	-	-	4.8
IN	4.6	4.6	4.4	4.7	4.3	-	-	5.2
IF	4.2	4.3	4.4	3.6	3.7	-	-	4.6

Sw = Swedish, D = Dictation, RC = Reading Comprehension, E = Experimental, MS = Middle spring semester, ES = End of spring semester, IN = native-born immigrants, IF = foreign-born immigrants

As the report is a preliminary one only, no tests of significance have been given, and not all results have been reported. Test scores in mathematics and Swedish (dictation and reading comprehension) are given for all classes in the study with n:s as reported above. Tests in Swedish for experimental children (Sw_{E_D} and $Se_{E_{RC}}$), and in English have lower n:s (around 365 for Swedish children, 85 for native-born immigrant children and 30 for foreign-born children) as these results are concerned with the 24 experimental classes only.

As can be seen from the Table, differences between Swedish children and native-born immigrant children (on a 9-point standard scale) are small and in most cases negligible. The tendency for foreign-born immigrant children to perform somewhat lower is evident, bud the differences are not large. The immigrant children constitute a heterogenous group. When they are divided into subgroups according to SES, LOR, and nationality of parents, it becomes evident that children with one Swedish parent do somewhat better, as do children of parents with a long length of residence (LOR). The type of marriage (mixed or not) interacts with SES.

The immigrant children, as well as the Swedish children with early English tend to do as well in tests in Swedish as the total group of children. The second language does not appear to have been disturbed by the third, which strongly speaks against the theory of prior languages having to be established before later languages can be learned.

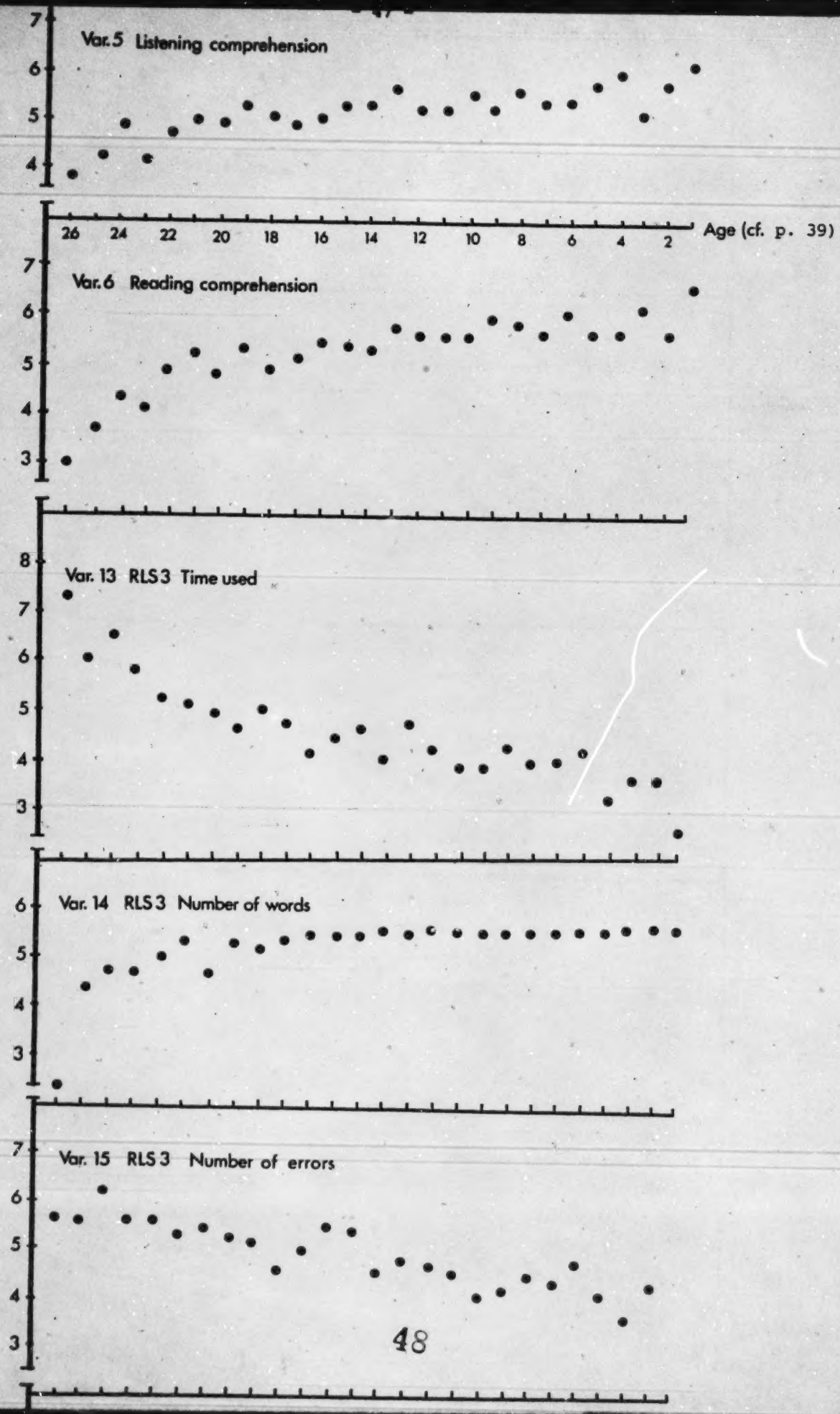
While awaiting further results from the EPÅL project, it may be mentioned that Swedish children in grades 1-6 with an early start in English tend to do better in Swedish than control children, that immigrant children in grades 1-6 do as well in English as Swedish children and that immigrant children do worse in Swedish than Swedish children, not surprisingly (Linell, 1977, personal communication). In other words, it seems as the introduction of a second language during the establishing of the first supports the first language, contrary to Malmberg´s (1971, p.122-126) very strong claims of the "harmfulness" of early L 2 learning.

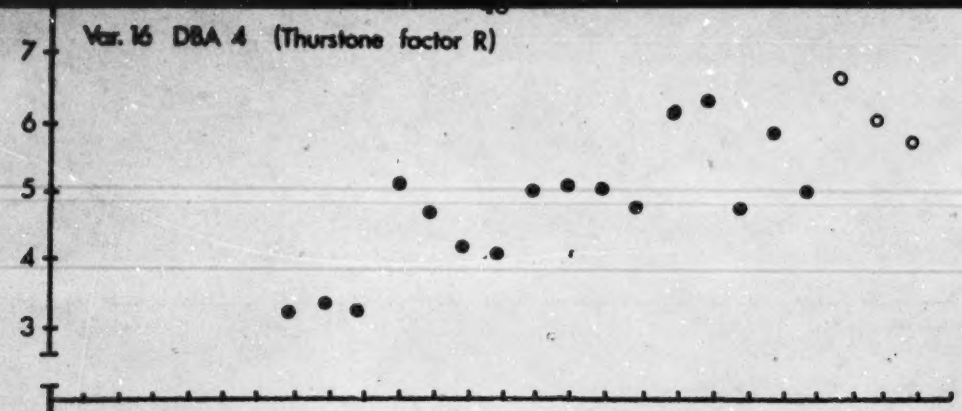
On the other hand, the preliminary results available from the EPÅL project seems to fit in very well with the hypothesis of the importance of learning set formation, as discussed in connection with the previous paper (pp. 24-30).

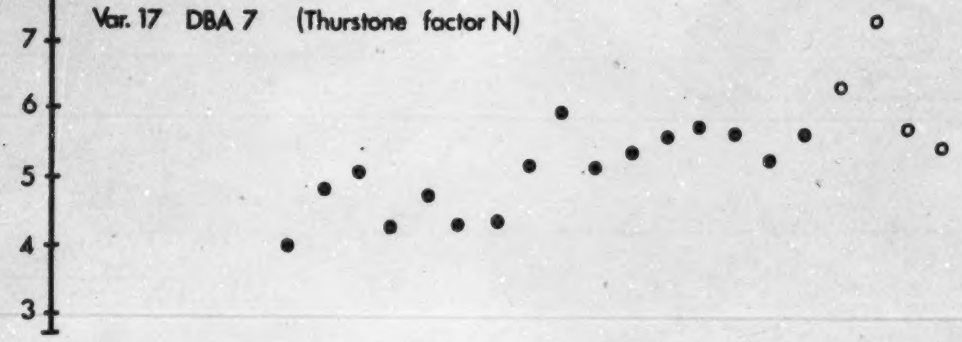
All these data support the interpretation that the most important factor in L 2 learning, as in most other learning, is the general development, particularly the cognitive and perceptual-motor domains.

For practical purposes, the level of development and the language situation in the individual case seem to be the factors to be considered.

Figure 1
Test




Var. 16 DBA 4 (Thurstone factor R)
7
6
5
4
3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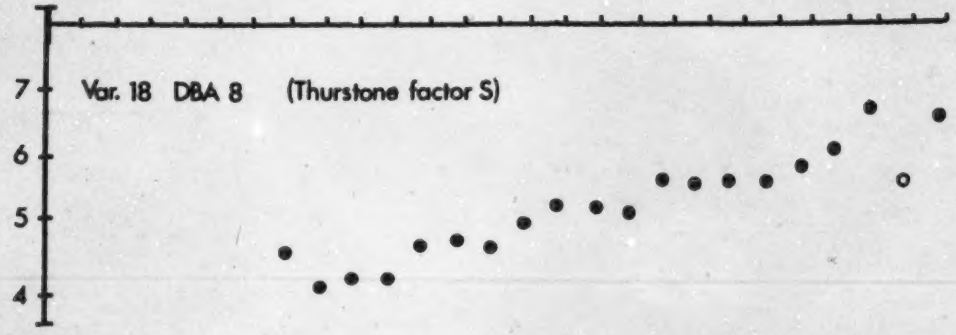
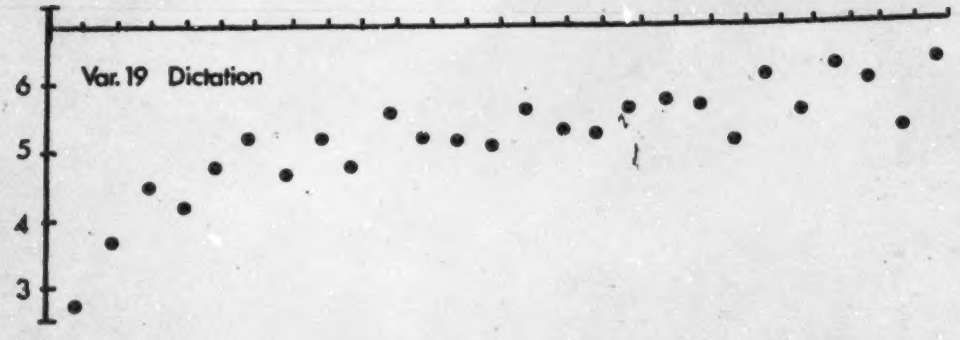
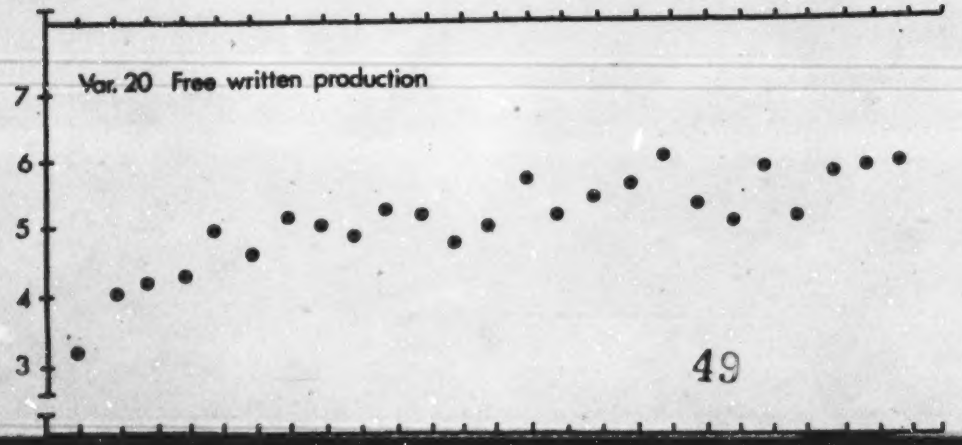
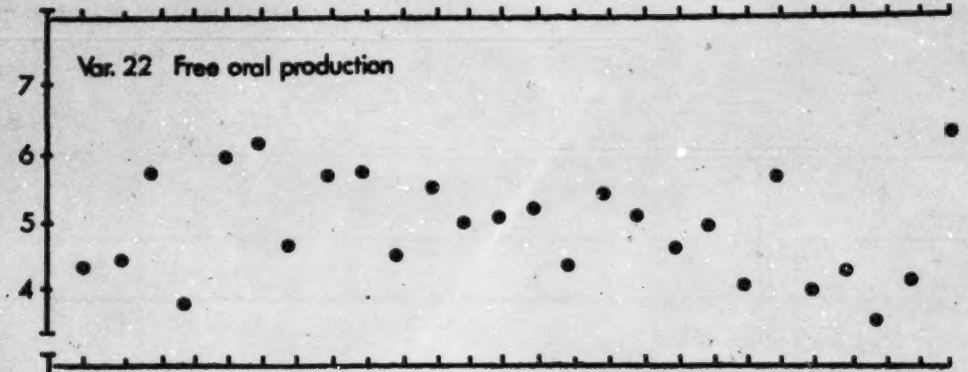
7
6
5
4
3

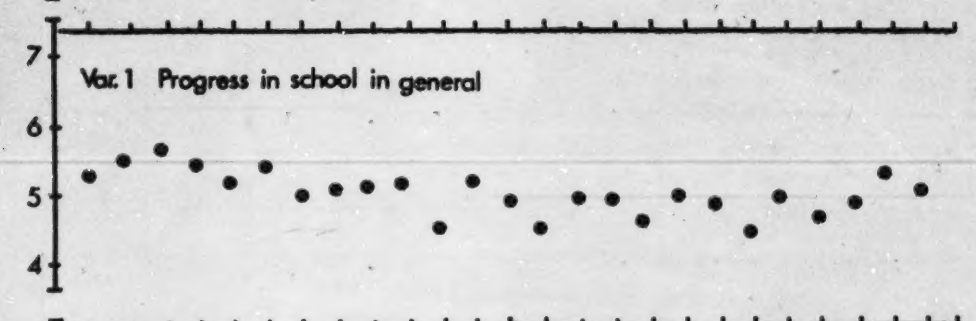

Var. 18 DBA 8 (Thurstone factor S)
7
6
5
4

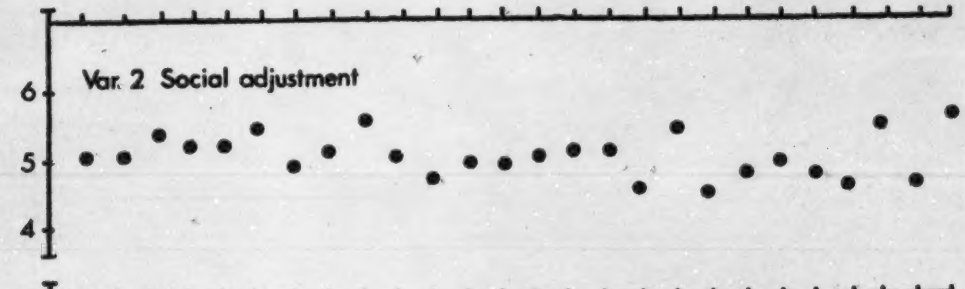

Var. 19 Dictation
6
5
4
3

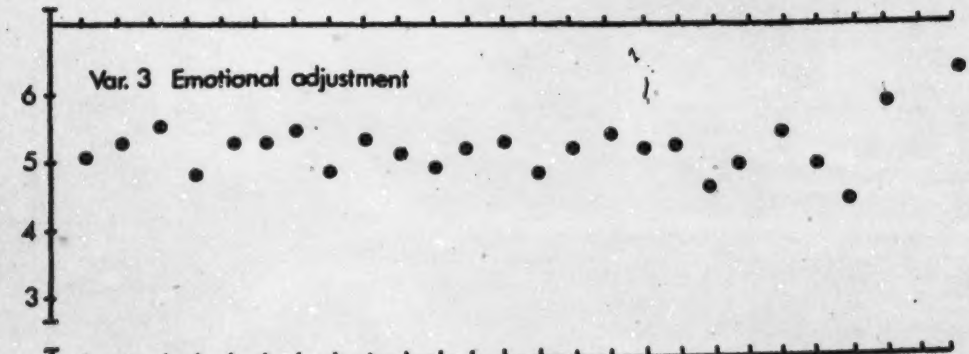

Var. 20 Free written production
7
6
5
4
3

Var. 21 Pronunciation
7
6
5
4


Var. 22 Free oral production
7
6
5
4


Var. 1 Progress in school in general
7
6
5
4


Var. 2 Social adjustment
6
5
4


Var. 3 Emotional adjustment
6
5
4
3

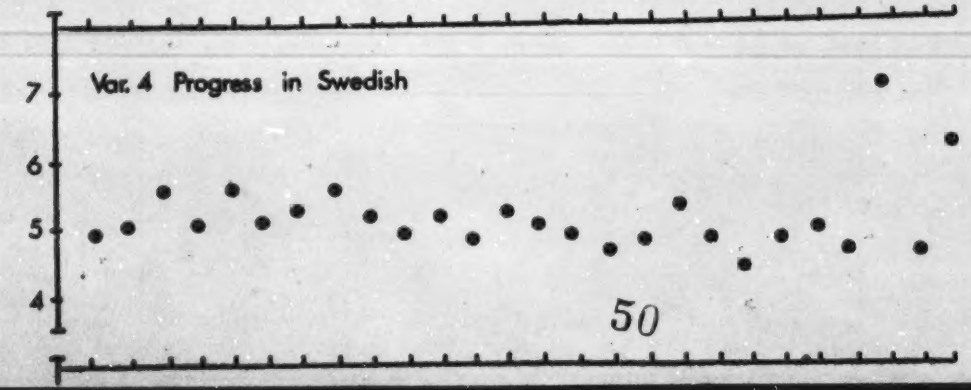

Var. 4 Progress in Swedish
7
6
5
4

Table 4. Intercorrelations between background variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1 Age		X^2 15.5 df 12 C .09 NS	X^2 11.7 df 6 C .08 NS	X^2 11.0 df 9 C .08 NS	X^2 13.3 df 12 C .10 NS	X^2 13.2 df 9 C .09 NS	X^2 6.9 df 9 C .08 NS	X^2 25.9 df 9 C .12 xx	X^2 2312.6 df 6 C .73 xxx	X^2 9.3 df 3 C .07 x	X^2 69.2 df 12 C .19 xxx	X^2 56.0 df 9 C .17 xxx
2 Nationality			X^2 160.5 df 8 C .27 xxx	X^2 513.4 df 12 C .46 xxx	X^2 302.9 df 16 C .42 xxx	X^2 105.1 df 12 C .24 xxx	X^2 35.2 df 12 C .17 xxx	X^2 231.9 df 12 C .34 xxx	X^2 6.6 df 8 C .06 NS	X^2 6.6 df 4 C .06 NS	X^2 79.9 df 16 C .20 xxx	X^2 65.9 df 12 C .18 xxx
3 Length of residence				X^2 30.5 df 6 C .13 xxx	X^2 29.3 df 8 C .15 xxx	X^2 3.2 df 6 C .04 NS	X^2 6.7 df 6 C .08 NS	X^2 19.5 df 6 C .11 xx	X^2 13.3 df 4 C .08 xx	X^2 0.9 df 2 C .02 NS	X^2 25.5 df 8 C .12 xx	X^2 648.4 df 6 C .50 xxx
4 Father's occupation in Sweden					X^2 2482.7 df 12 C .81 xxx	X^2 137.0 df 9 C .28 xxx	X^2 75.5 df 9 C .26 NS	X^2 11.7 df 9 C .08 NS	X^2 10.9 df 6 C .08 NS	X^2 6.6 df 3 C .06 NS	X^2 16.7 df 12 C .10 NS	X^2 11.1 df 9 C .08 NS
5 Father's occupation at home						X^2 90.0 df 12 C .26 xxx	X^2 80.5 df 12 C .26 xxx	X^2 20.4 df 12 C .13 NS	X^2 8.2 df 8 C .08 NS	X^2 4.3 df 4 C .06 NS	X^2 27.5 df 16 C .14 x	X^2 14.9 df 12 C .10 NS
6 Mother's occupation in Sweden							X^2 1216.3 df 9 C .72 xxx	X^2 88.3 df 9 C .24 xxx	X^2 12.2 df 6 C .09 NS	X^2 3.9 df 3 C .05 NS	X^2 27.6 df 12 C .13 xx	X^2 31.5 df 9 C .14 xxx
7 Mother's occupation at home								X^2 25.9 df 9 C .16 xx	X^2 5.0 df 6 C .07 NS	X^2 2.3 df 3 C .05 NS	X^2 15.5 df 12 C .12 NS	X^2 12.2 df 9 C .10 NS
8 Number of brothers & sisters									X^2 14.5 df 6 C .09 x	X^2 2.6 df 3 C .04 NS	X^2 23.8 df 12 C .12 x	X^2 8.7 df 9 C .07 NS
9 Grade in 9-year Sw school										X^2 5.4 df 2 C .05 NS	X^2 80.3 df 8 C .20 xxx	X^2 34.4 df 6 C .13 xxx
10 Type of class (spec-ord)											X^2 6.4 df 4 C .06 NS	X^2 .8 df 3 C .02 NS
11 Teaching materials												X^2 63.9 df 12 C .15 xxx
12 Previous knowledge of Swedish												

Part IV:

ADJUSTMENT AMONG IMMIGRANT PUPILS IN SWEDEN

(International Review of Applied Psychology, 1976, 25 (3), 167-188.)

PROBLEM

It has often been argued that there is a higher rate of social and emotional disturbances among immigrant children than among native children. As a rule, this assumed peak is ascribed to the lack of command of the new language (Gelinek, 1974).

METHOD AND RESULTS

Data from the data bank for the population of immigrant children briefly described in the previous study were used for attempts to study the two problems stated above. The same tests and background data as in the previous study thus are employed in the present one. The 2,188 pupils for which data were obtained belong to a population which is estimated to have been around 2,400 pupils in Sweden at the time for the data collection. They represent 36 nationalities and are fairly evenly distributed over grades 1-7 with a smaller number in grades 8 and 9. 62 % of the pupils come from Finland, 16 % from Yugoslavia, 5 % from Greece, 2.6 % from U.S.A., 2 % from Italy respectively Hungary and the rest is distributed over the remaining 30 nations.

The teacher observations were quantified and coded in a five-point scale where 1 is a very bad and 2 is a very good adjustment. The results shov average Progress in School ($\bar{X}$ = 2.95), better than average Social Adjustment, defined as getting along with school mates ($\bar{X}$ = 3.5), better than average Emotional Adjustment ($\bar{X}$ = 3.5) and average Progress in Swedish ($\bar{X}$ = 3.2). These data do not seem to support comprehensions of a particularly poor social and emotional adjustment among immigrant pupils. It should, however, be stressed that this approach is a tentative one, that the adjustment assessments are afflicted with many uncertainties and that no Swedish control group was studied.

The intercorrelations between the language tests are .57 on the average, .52 between the adjustment assessments, .33 for the intelligence tests and .73, .75 and .76 for three different evaluations of the three reading tests. These results are all fairly normal and expected.

The average intercorrelation for language by adjustment variables is .19 only, .26 for intelligence by language variables, .11 for intelligence by adjustment variables, .37 for reading by language tests, .12 for reading tests by adjustment variables and .18 for reading by intelligence tests.

DISCUSSION

Several of these averaged correlations are surprisingly low, in particular for the language by adjustment matrix and the intelligence by adjustment matrix. On the basis of the often suggested relationship between language skills and emotional and social adjustment, one would have expected much higher correlations between the tests of these domains. As cognitive variables, such as amount of education, have been shown to explain an appreciable part of the variance of the variable mental health in adults (Lasry & Sigal, 1976), also the intelligence by adjustment matrix average seems unexpectedly low.

A number of checks on possible statistical artifacts and other sources of error were performed, but the results remain the same. A study of other data on the relation between cognitive and affective variables, such as motivation and school achievement, reveals that such studies generally yield low correlations, contrary to what is often believed. In addition to the studies mentioned in the original paper, I might add a few often cited ones, such as Lambert, Gardner, Barik and Tunstall (1963), Gardner and Lambert (1959), Gardner and Lambert (1972), that reveal that very strong claims of the role of motivation in second language learning have been built on surprisingly low associations between those variables. In fact, theoretical concepts, such as the notions of instrumental and integrative motivation, have been built on weak associations and have had to be revised later on.

While it should be remembered that the present study is burdened by a number of imperfections, the main results are consistent with other empirical evidence. Some tentative hypotheses which might serve as a point of departure for further research are listed in the paper.

The indications of a more positive state of adjustment than has been feared are at least partly borne out by some other studies, yielding similar results. These studies too, however, suffer from shortcomings. Comparisons with other studies of the mental health in native children such as that of Jonsson and Kälvesten (1964) and previous studies, reviewed by these authors (op.cit.), suggest that the state of mental health

in native populations seems to be worse than formerly believed. Rutter et al. (1974) studied immigrant and stationary children in London and found rather high percentages of disturbances, according to psychiatric ratings in both groups. The difference was such that there was a tendency to significance only. Takač (1977) compared native with immigrant children and found small but significant differences in favor of native children in all variables.

The fact that the studies of Jonsson and Kälvesten and Rutter et al. both are conducted in large cities suggests that the high rates of emotional disturbance reported in these studies might be an urbanization problem. That such a hypothesis is not unreasonable is shown by the research by Parker, Kleiner and Needelman (1969) who found that, contrary to expectations, adult migrants in the U.S.A. who moved from a big city to another big city showed a higher rate of mental illness than migrants raised in the countryside.

On the whole, it seems that problems of migrant adjustment are far more complex than they may appear at first glance. Other factors than migratory ones might well lie behind problems that are conventionally ascribed to the process of migration. The problems that do appear among immigrant children must, regardless of the causes, be attacked with a much wider spectrum of action than just language teaching.

As a theoretical explanation of the pervasively low correlations between not only language variables and socio-emotional adjustment as reported in the empirical part of this study, but also between various measures of motivation and language, mathematics and other school subjects, I would like to propose the "hypothesis of indirect influences".

It will be recalled that experimental research seems to support the correlational studies (vide supra. p. 28). Pavlov's (1960) experiments with neuroses actually are examples of how severe cognitive conflicts bring about emotional and cognitive disturbances, while Harlow's experiments show how emotional disturbances of a depressive nature may affect higher cognitive functions. The experiments of Harlow and his coworkers seem to contain the seed to a theory which might explain not only some indirect influences of the affective system on the cognitive domain, but also supply a new theory of motivation in the place of the prevailing ideas which in fact have suffered a severe break-down in view of what the data actually say.

Studies of the behaviour of healthy and disturbed monkeys (see for instance the film on Harlow's experiments, "Nature and development of affection") make it appear perfectly obvious that a disturbed monkey turns away

from the environment. Yet most normal cognitive functions remain unimpaired. This is in harmony with results from clinical studies on depression in humans (Zimmer & Foy, 1963), indicating that stimulus reproduction, perceptual acuity and evaluation of reality are all accurate (though slowed down, and interpretation of causality is biased by guilt), while involvement with the physical and social environment is restricted (p.306). In other words, experiences which involve learning and problem-solving, i.e. learning set formation, are restricted.

On the other hand, the monkey child who has access to constant bodily and visual contact with his mother courageously explores the environment, thereby gaining a rich environmental experience. In other words, a confident and active individual creates his own enriched environment, while the depressed individual creates a deprived environment.

In conclusion, emotional stability and a confident personality is created by close and constant contact between parents and child, while isolation and separation (intermittent contact and isolation situations) create anxiety, aggression, lack of self-confidence and depression. While these states only in severe cases have a direct influence on higher cognitive functions, they virtually create individual deprived environments, which in the long run prevent an optimal cognitive development.

It is generally, and implicitly, assumed that motivation is a variable, or set of variables, mainly belonging to the affective domain. Such an assumption is not suggested by existing evidence. I would like to propose that motivation mainly is a cognitive variable. In other words, learning set formation as a result of hard work makes it increasingly easier to perform cognitive operation, which in turn breeds an interest for the tasks that are to be done. It will be recalled that Hebb defined selective attention and expectancy as resultants of set formation (vide supra, p.20).

Attitudes and other affective variables are, according to the hypothesis advanced, consequences of, not prerequisites for learning. Learning and problem-solving may operate as their own reinforcers. Such a theory has implications for the whole range of school activities. As a lecturer in education I have attended a large number of lessons over the years and I have often wondered why so much learning in pupils actually takes place in spite of the poor amount of positive reinforcement given. I have also wondered why pupils in classes where the teacher manages to create a warm and friendly atmosphere do not seem to learn very much more than pupils in "ordinary" classes. Such observations, which are anomalies according to

existing theories of motivation, are easily explained by the hypothesis of indirect influences and the hypothesis of motivation as a primarily cognitive variable. Indirect influences from a warm emotional climate operate over a long period of time and if the environment is not restricted in itself, which a school certainly is. Problem-solving, particularly in the form of practical applications of theoretical knowledge, is a minor part of the daily life in our schools.

On the other hand, the implications should not be carried too far, as I believe that there are very important interactions between didactic situations and personality factors in the pupils.

Part V:

SOCIAL AND INDIVIDUAL FRAME FACTORS IN SECOND LANGUAGE LEARNING: COMPARATIVE ASPECTS

(In: Skutnabb-Kangas, T. (Ed.) Papers from the first Nordic conference on bilingualism. Helsingfors: Universitetet, 1977. Pp. 40-61.)

PROBLEM

A large number of factors are involved in L 2 learning. They may be referred to as being either largely individual or largely social. Such a factor is motivation. It is sometimes argued that immigrant students of the host language are in a completely different motivational situation from native students studying a modern language. Therefore, teaching methods, the learning process and most other variables must be quite different. Such a view has been forwarded by lecturers in methodology in modern languages, publicly as well as privately (certain lecturers, personal communication). Such a view gains support in the claim of Ervin and Osgood, 1965, who claim that L 2 learning in school means just learning another code for similar concepts, a compound language system, while learning L 2 in a bilingual setting means learning different codes for different sets of concepts, a coordinate language system. It is claimed (p. 140) that these systems represent two entirely different kinds of events in the nervous systems. Such an arbitrary classification of L 2 learning situations, however, is wide open to criticism. It does not, for instance, cover the situation of immigrant children. The coordinate system is equal to a diglossia situation, but two languages are rarely so widely separated as the definition suggests.

Such hypotheses can only be tested with comparative research strategies. To my knowledge, no experiments have been designed to carry out quantified comparisons between different kinds of motivational settings. It is possible, however, to make a crude comparison by comparing the outcome of the same frame factors in different experiments. If the outcomes turn out to be similar, the motivational situations cannot be completely different, and at least it would be a first step towards more formalized comparative strategies.

Examples of social frame factors are teacher factors, such as age, sex, competence, personality, creativity, teaching experience, expectations; cultural factors, such as degree of urbanization; school factors, such as

size of class. Examples of individual frame factors are intelligence, SES, language aptitude, native language, sex, age and several others.

Some results from the Swedish large-scale study "English in grade 6" and the UMT project (see Introduction) as well as from other studies indicate that L 1 in spite of opposite claims seems to correlate moderately only with L 2 or correlations in the range .20 - .50. This is the same range as for correlations L 2 - L 3 and for correlations between non-verbal tests of intelligence and L 2. Degree of urbanization seems to play a definite part in that a countryside environment seems to be positive, particularly when intelligence and SES, having lower average values in rural environments, are kept constant. Teacher sex seems to have none or little impact, as somewhat astonishingly teaching method. Pupils' sex in contrast gives significant test differences. Teacher education before teacher training yields no differences, while teacher competence in L 2 yields significant or almost significant differences in several variables, most noticeable with boys. Radio teaching yields some differences, particularly with girls. All the results mentioned come from modern language teaching in native student populations.

METHOD

Again, the earlier described data bank from an immigrant pupil population was used. The background variables collected for that study include many of the frame factors discussed above. The native language problem can be approached with a comparative strategy involving comparisons between a number of native languages instead of the traditional approach with correlational studies of one L 1 and one L 2 at a time. Simple analyses of variance were employed to test the significance of possible differences. The strength of the association between the independent variables (the frame factors) and the dependent variables (the tests) were estimated by means of ω^2 values.

RESULTS

When nationality is used as an L 1 index, adjustment measurements and most reading test measures give non-significant results. The language tests yield significant differences in favor of the Finnish and Spanish pupils, who also do best on the intelligence tests. When language group (related languages according to the linguistic classification) is used as an L 1 index, almost

all variables, except one or two of the reading measures, yield significant differences, but the ω^2 values are very low. With this index, the Slavic and the Germanic groups do best in language and reading tests and also on the intelligence tests.

SES yields small but significant differences to the disadvantage of workers' children, who also do worse on two out of the three intelligence tests. Interestingly, this is true not only for language and reading tests, but also for the adjustment measurements. The ω^2 values are very low, however.

LOR gives significant differences in favor of longer stay, but the ω^2 values are rather low. Previous knowledge of Swedish yields significant differences in all variables, including intelligence and adjustment variables. The fairly high ω^2 values for language tests and reading tests reveal that this background variable is related to language and school adjustment (Progress in School and Progress in Swedish), while there are low ω^2 values for social and emotional adjustment and intelligence.

In summary, the following similarities between the immigrant study reported here and various studies of L 2 learning in the school situation appear to be: sex and age differences, comparatively small but definite L 1 influences, SES differences, certain teacher factor differences, rather small method differences, small but definite cognitive influences, and certain cultural influences, such as the degree of urbanization.

DISCUSSION

The factors studied seem to work much the same way in two different motivational situations. This finding suggests that second language learning basically is brought about by the same mechanisms in all types of situation, in all probability biologically anchored, i.e. in the nervous system. Such a conclusion is strengthened by the observation that individual frame factors seem to produce more clear-cut differences than the social frame factors. Of the social frame factors, those belonging to what might be called cultural factors, such as degree of urbanization and also SES, which has rather arbitrarily been classified as an individual frame factor, seem to be most pervasive. Factors belonging to the teaching situation operate temporarily, as it were, and seem to be able to affect the results to a lesser degree than might be expected. This interpretation might be formulated thus: the pupil is a product of inheritance and more stable environmental factors. When he is put into a learning situation, the result to a large

extent is a function of these factors.

These rather tentative interpretations do not mean that the teaching factors are unimportant. In the first place, some interesting findings do emerge from a study of these factors. Secondly, as they affect the individual only a few hours a day during a limited number of years, it is all the more important that efforts to increase their efficiency per se, without putting pressure on the individual by demanding more from him.

This line of reasoning, withoug being completely conclusive from the survey type of data presented here, does cast some suspicion on the notion of the great dissimilarity of the two bilingual situations, and of the notion that language learning mechanisms are completely different in different situations. In the first place, motivation and other emotional factors do not seem to play such a large part as generally assumed. Secondly, though there might be some motivational pressures on immigrant pupils that do not exist in modern language teaching in native schools, there are also counter-balancing factors, for instance, that the mothers of immigrant children often do not learn the new language to a very great extent. The most likely difference to be expected is the fact that immigrant pupils in the long run are more exposed to a second language and therefore might achieve a more native-like command in the end than pupils learning L 2 in their native schools.

Such a development seems to be a slow process, however, judging from this study and that of Toukomaa, 1975. LOR seems to have small effects, judging from the low ω^2 values. Toukomaa finds that the L 1 is rapidly forgotten, while it takes considerable time to achieve proficiency in the new language. The time for the language shift, i.e. L 2 becomes the better (but not necessarily a good) language is between four and five years. As the majority of the pupils of the present study have been in Sweden for not more than two years, this narrow range of LOR might explain the small effects of this frame factor.

Interestingly, intellectual factors of a non-verbal character seem to play a not negligible part. In the first place, this means that the effects of the various frame factors should be studied by means of analysis of covariance, in order to control for intelligence. This might give somewhat more clear-cut results, though the correlations are not such that dramatic changes should be expected. Such a continuation of my research program is already under work. Secondly, and more interestingly, this finding suggests that general cognitive factors play approximately as large a part as the

native language. In fact, they may play a larger part, as the L 1 - L 2 correlations may be somewhat spurious in the respect that the two variables probably have some cognitive components in common.

An important educational consequence of this finding, which furthermore is supported by basic research results (Clark, 1976; Glucksberg, 1969; Moore, 1973), is that language learning is not enough. Neither teaching in L 2, nor teaching in L 1 ("home language teaching"), which is now en vogue in Sweden and elsewhere, will solve the language learning problem. As Bruner (1976, a, b, c) Halpern and Aviezer (1976), Clark (1976) and others have shown, concept formation and communicative factors other than language develop prior to productive language. In addition to language training in L 1 and L 2, procedures to stimulate and facilitate the general cognitive development should be developed and applied. Such work is underway (see for instance Heron & Kröger, 1974). See also research reviews, discussions and educational suggestions in Ekstrand (1977 b). Confer also discussions regarding the prior papers in this summary, where the importance of cognitive factors is discussed. In particular, the discussion of the pros and cons of early language teaching and the possible importance of learning set formation is relevant in this context.

The relatively weak effects of SES are probably due to the fact that they have been measured with one variable only, father´s occupation, in combination with the limited range of occupations. SES need to be assessed with a combined set of measurements. A school psychologist once said to me: "after a certain amount of L 2 teaching, it doesn´t matter how much more such teaching you give some of the immigrant kids. They do not progress. It is as if they reach a cognitive limit." The large amount of research on stationary bilingualism seems to contribute to our understanding. The first studies showed that bilinguals were in general inferior in intelligence as compared with the members of the monolinguals of the majority group. When tests of verbal intelligence were abandoned in this research in favor of non-verbal tests, the picture changed. It changed still more, when it was discovered that the bilingual minority often lived in a rural environment, where SES and intelligence levels on the average are lower than in cities. When these factors were controlled, bilinguals were often found to be at least equal and sometimes superior to minolinguals with respect to intelligence (see Skutnabb-Kangas, 1975, and Ekstrand, 1977 b for reviews and references). Wennerström (1967) found that SES was a very important variable for the school progress of immigrant children.

The immigrant children that come to Sweden generally belong to lower SES strata. In other words, part of the language and cognitive development in immigrant children is a social problem, a conclusion shared by Skutnabb-Kangas (1975, p. 86).

As the Milwaukee project (see discussion on pp. 29, 36) shows, it is possible to compensate for a strongly deprived environment by a "total immersion" program. While it is in practice impossible to expose large groups of children to such a program, we may learn some principles from that project and other research that may improve the development of the immigrant children. In doing so, we will in fact also learn something about how to help to compensate the native children for social handicaps.

SOME FINAL WORDS

The five selected papers, presented in this concluding report, are part of a research work in second language acquisition and in immigrant adaptation that has been going on during almost twenty years. Some findings seem to be stable, such as the developmental course of second language learning ability, i.e. the age effects. Other results may be more tentative, such as the lack of correspondence between language and emotional adjustment, though no studies so far have been able to demonstrate strong correlations between cognitive and affective factors.

What the studies do demonstrate is the complexity of the second language learning process and the even greater complexity of migrant adaptation in general. This complexity tends to become hidden in the general debate because some people reduce the argument to contending one single course of action, auch as the "home language teaching" notion. While I would like to argue strongly that home language teaching must continue, I would like to issue a warning against a naive belief in the value of this kind of limited action. What is needed is a broad spectrum of measures, based on careful research, rather than upon optimistic belief in miracle procedures.

The tests in these studies are psychological tests of functional language skills, designed to assess listening, speaking, reading and writing skills. Now there is a strong tendency towards contrastive linguistics based testing procedures.

I would like to point out that it is possible to measure language functions on several levels. There is a physical level, applied for instance in instrumental phonetics with instruments such as sound spectrographs and speech synthesizers, or in reading research such as electronic eye movement observation devices. There is a psychological level, a neuro-physiological and neurological level, an educational level and there is a linguistic level. Hopefully, the measurements on the linguistic level, with error analyses and so forth, will provide increased information about language learning processes. There seems to exist a certain danger, however, that linguistic measurements may be regarded as possible to substitute for all other kinds. It should be observed that linguistic methods do not have that kind of power. They tend to analyze language in great detail, but do not cover all sides of a complex communicative behavior. The different levels of measurement must be regarded as complementary, not exchangeable.

The methods of measurement that we started to develop twenty years ago have continued to function well. The high reliabilities reported in the first paper have remained good in other settings, and satisfactory values have been reached for later developed tests.

The reliability coefficients for some of the language tests used in the last three papers are the following. The Kuder Richardson 20 coefficient for the Listening Comprehension Test is .95 and for the Reading Comprehension Test is .94. The α coefficients, which may be regarded as a lower limit for the reliability rather than the actual reliability, are .97 for the Free Written Production Test, .95 for the Pronunciation Test and .93 for the Free Oral Production Test. Thus it is possible to measure language behavior on a functional, complex psychological level with a high degree of precision. We do not know the reliability of the teacher observations, but the correlations between two independent judgements of the teacher answers were .81 for Progress in school, .77 for Social adjustment, .75 for Emotional adjustment and .77 for Progress in Swedish.

There is not much point in discussing the validity of the tests in detail here. As mentioned before, there do not exist good criteria. In fact, I have tried to use the best measures possible as tests. The question of validity is one of content validity and possibly of construct validity. These kinds of validity cannot be estimated with validity coefficients, but only subjectively assessed. In my opinion, the content validity cannot possibly be higher, as the tests directly reflect the language behavior and the result from this behavior. This opinion I cannot prove statistically, only contend.

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Abstract card

Ekstrand, L.H. Bilingual and bicultural adaptation. Studies in the assessment of second language learning and of factors related to bicultural adjustment, with special reference to immigrant children. Educational and Psychological Interactions (Malmö, Sweden: School of Education), No. 66, 1978.

The report summarizes five papers and attempts to put them into a theoretical frame of reference. The first paper deals with metric problems in the assessment of second-language proficiency. The second and third papers deals with optimum age problems in second-language learning within different settings. The fourth paper deals with relations between language learning and socio-emotional adjustment. The fifth paper considers a number of social and individual frame factors for second-language learning.

Indexed:
1. Bilingualism
2. Minority groups
3. Second languages

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